CREWS CLIMATE RISK & EARLY WARNING SYSTEMS

Annual Report

2023

Building momentum

WORLD METEOROLOGICAL ORGANIZATION

GFDRR Global Facility for Disaster Reduction and Recovery

Administered by THE WORLD BANK IBRD • IDA | WORLD BANK GROUP

UNDRR UN Office for Disaster Risk Reduction

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Standardization: Differences in methodologies, definitions, and reporting responsibilities among and between implementing and operational partners.

Reporting time lag: Internal processes can affect availability of definitive figures and information.

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The CREWS Initiative

The Climate Risk & Early Warning Systems (CREWS) Initiative funds life-saving climate action.

We help the world's poorest and most vulnerable countries build early warning systems against hazards such as floods and drought.

Our goal is for the poorest and most climate vulnerable people to be able to protect their lives and livelihoods in the face of climate danger. We can do this by ensuring timely, accurate forecasting and early warning reaches every person for necessary action.

We work with and benefit from the expertise and leadership of governments along with the collective experience of our implementing partners – the World Meteorological Organization (WMO), the World Bank Group/Global Facility for Disaster Risk Reduction and Recovery (GFDRR), and the UN Office for Disaster Risk Reduction (UNDRR).

Our support for Least Developed Countries and Small Island Developing States is through a pooled Trust Fund – with contributions from Member States. In 2023, there were 12 CREWS Members.

Our growing membership and financial support testify to the relevance, urgency and value of our work.

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Foreword

Building momentum defines the CREWS Annual Report 2023. The leadership and commitment of national governments and regional agencies, CREWS funders, and our implementing partners have built an ambitious platform for action at scale, generating considerable momentum. The vision of the Early Warnings for All initiative further boosted it, creating new opportunities for people-centred, science-based and effective multi-hazard early warning systems at scale.

We continued to build national and international momentum in our mission. We set in motion changes enabling CREWS' strategic and operational alignment with the Early Warnings for All initiative. This included bringing the International Telecommunication Union (ITU) and the International Federation of Red Cross and Red Crescent Societies (IFRC) into CREWS as implementing partners. Our country-driven financing will enable national institutions to benefit from the wider and growing range of expertise and services, supporting their remits to serve and protect.

Our operational momentum gathered by meeting high demand for accelerated support financing. With 24 active or new projects and quick interventions in 2023, funds committed to follow up projects in the Caribbean and Niger, and a new initiative in Djibouti, we doubled CREWS operations in three years.

We must maintain this drive while simultaneously and confidently communicating achievements. However, we must continually improve. 2024 will see a more comprehensive and robust CREWS system to monitor our results, assess our impact, and use our learning for even greater impact.

This Annual Report captures progress and results against quantified indicators. In 2023, significant headway was made across markers with WMO, WB/GFDRR and UNDRR support and often in collaboration with many other partners.

CREWS supported new or improved forecasting and warning services for 125 million people in 19 countries. Flash flood guidance systems for Burkina Faso, Mali and Niger – all affected by conflict – ensure 73.7 million people have more notice of this sudden onset danger. An initial review in Mali shows it had already saved lives. Altogether, at least 396 million people have CREWS-supported forecasting and early warning services since 2017.

Strategic Plans and Frameworks will strengthen governance on weather and climate services and social protection from climate shocks in 11 more countries. Innovation, smart technology and tailored products for farmers, fishermen, and populations in Chad, Togo, Fiji and Jamaica exemplify our people-first focus for direct reach with targeted solutions and full-value chain approaches.

Our adapted operations in Sudan and Afghanistan offer new solutions to better serve populations left increasingly exposed from hazards and conflict. This agility is critical as we explore how to reach vulnerable populations without minimum weather and climate services during conflict or fragility. The go-ahead on a joint initiative with the Green Climate Fund to scale up early warning finance will see a first roll out in five countries in Africa, Asia Pacific, and the Caribbean.

2023 also saw increasing momentum in recognition of CREWS. We warmly welcomed Austria, Monaco and Norway as CREWS Members, taking our financing partners to 12 strong and widening our reach. Contributions from new and existing Members provided an additional $28.5 million and we applauded France's doubling of its yearly contribution to 8 million Euros. I am deeply grateful for our Members' engagement.

CREWS' unabated ambition and commitment to provide people-centred early warnings for all will further drive momentum. Together, we will translate this into greater results in 2024.

Gerard Howe

Head, Adaptation, Nature & Resilience Department
Foreign, Commonwealth and Development Office, UK
Chair, CREWS Steering Committee

2023 in numbers

12 **CREWS Members**

– **Austria, Monaco** and **Norway** joined, pledging $18.32 million

21 **active projects or interventions across 3 regions**

Another **6** country and regional projects and accelerated interventions going ahead

24 **countries**

supported by CREWS affected by conflict or fragility[1]

396+ million

people in **45** countries with access to forecasts and early warning services developed or improved with CREWS support since **2017**[2]

125+ million

people with new or improved forecasting / warning services in **19** different countries in Africa, Asia Pacific and the Caribbean in **2023**

3 **more countries** with flash flood guidance systems in place

Enabling more timely and accurate prediction and warning for **73.7 million people** on a deadly sudden onset hazard in Burkina Faso, Mali and Niger

19 **forecasting or warning products**

developed or adapted to better protect **105.7 million people** in **11** countries from at least **9** hazards

11 **countries or territories**

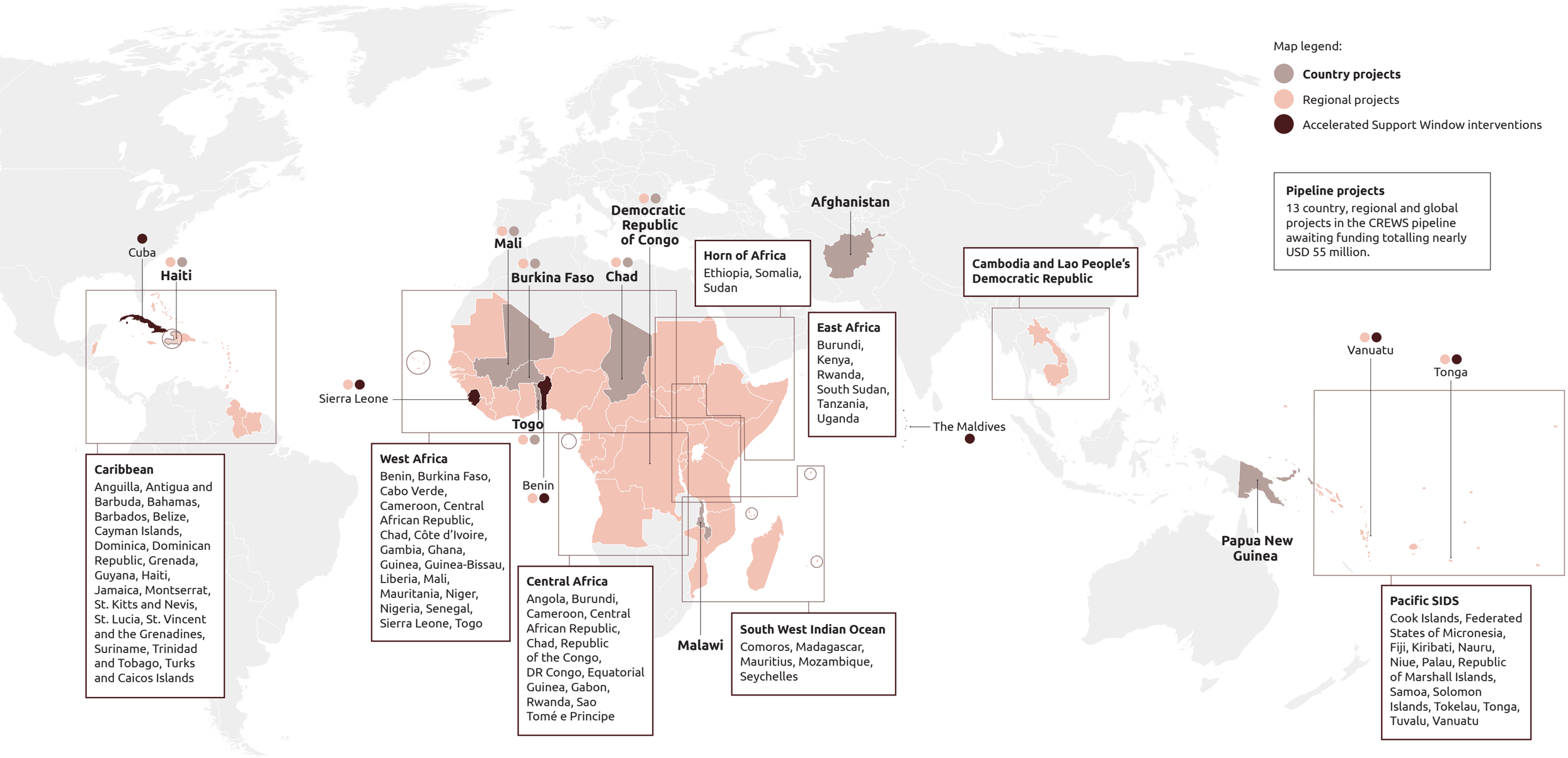
with stronger governance on weather and climate services or early action protocols

US$143 million

received or committed by **12**[3] countries and the European Commission towards our **US$250 million** funding goal for scaled up early warning action by 2025

1 https://thedocs.worldbank.org/en/doc/69b1d088e3c48ebe2cdf451e30284f04-0090082022/original/FCSList-FY23.pdf. In 2024, 2 CREWS Pacific SIDS were added to the fragile list while Sudan moved from fragile to conflict status.
2 Unless otherwise stated, and for consistency in methodology and sourcing, all national population figures are from Worldometer.
3 Including $7m from Canada prior to joining CREWS in 2022.

CREWS Initiative in action



Our results

Early warning systems are the linchpin of climate adaptation and disaster risk reduction. We embarked on the 'Early Warnings for All' initiative because every person on Earth needs to have access to timely, authoritative, and life-saving weather and climate risk information. CREWS is an important vehicle to achieve this goal.

Celeste Saulo
WMO Secretary-General

The World Bank is dedicated to supporting countries' efforts to build resilience to climate shocks. The technical assistance we deliver with funding from CREWS is critical to the identification, preparation, and implementation of government-led investments in and operation of early warning systems.

Bernice Van Bronkhorst
Global Director for Urban, Resilience and Land, World Bank

CREWS proved itself again in 2023 as an indispensable mechanism for translating global commitments to actions on the ground. We must build on this momentum to achieve the resilience goals of the Sendai Framework and the ambition to ensure everyone is protected by an early warning system.

Paola Albrito
Acting Special Representative of the UN Secretary-General for Disaster Risk Reduction

People

396.5 million people with access to forecasts and early warning services developed or improved with CREWS support so far

- In **45** countries, through **16** CREWS projects[1]
- Services delivered via CREWS support or collaborative initiatives
- **Not included:** populations receiving warnings using the Common Alerting Protocol (CAP) due to lack of data on actual accessing and reach
- If 2023 CAP use was included to illustrate more effective dissemination of warnings? Potential **632 million** people in **55** countries through **18** CREWS projects

In 2023

- **125.26 million** people from **19** different countries in **Africa**, **Asia Pacific** and **the Caribbean** had new or improved forecasting and / or warning services

Among them:

- **73.7 million** people in **Burkina Faso, Mali** and **Niger** now better protected from flash floods with more timely and accurate forecasts and warnings on a rapid onset hazard
- New or ongoing **community-based** support and outreach involving agrometeorological, flood and other hazard early warning and response services for **9.2 million** people in **5** countries

Highlights from Africa

West Africa

One of the first – and thus oldest CREWS projects – had already helped national hydro-met services in **8**[2] countries put in place products, systems, and skills to better serve a combined **124 million** population on hazards such as sand and dust storms and severe weather.

— 2023 saw the delivery of **flash flood guidance systems** (FFGS) in Burkina Faso, Mali and Niger.

An initial performance review of the system in **Mali** using a flash flood event in Bamako in May 2023:

— Mali Meteo had correctly predicted the flash flood. Timely alert issued through diverse channels avoided loss of life.

A flash flood guidance system will help forecasters give people more notice before floods such as this one in Burkina Faso. © Hemis/Alamy

1 CREWS Afghanistan, Burkina Faso, Chad, DR Congo, Haiti, Malawi, Mali, Niger, Papua New Guinea, Sierra Leone ASW, Togo, South West Indian Ocean, West Africa, Cambodia/Lao PDR, Pacific SIDS, Caribbean.

2 Burkina Faso, Cabo Verde, Chad, Mali, Mauritania, Niger, Senegal, Togo.

Burkina Faso

Important early warning steps taken on other hazards in 2023, not only flash floods.

— A new **website** – one of 4 co-funded with Norway's NORCAP – provides easily accessible and easy-to-understand weather and climate information and warnings for the national population. Along with other tools, it also enables semi-automated warnings on **sand and dust storms.**

— Agrometeorological support to **3** pilot communities and information dissemination through local radio helps improve food security for at least **170,000 people.** Initiated by CREWS, it is now continuing through the European Union.

Chad

Various developments with important ramifications for physical and economic security:

— Warning thresholds established on rain, wind, and temperature, enabling alerts to be issued once set levels are reached.

— Customized crop calendar includes climate and cultivars specific to Chad using new software to help increase yields for improved food security. Nearly 90% of Chad's **18.3 million** people are dependent on agriculture, with nearly 70%[3] employed in the sector.

— Nearly **13,700** farmers and family members at **4** pilot sites being supported via daily and 10-day forecasts, and co-produced site-specific agrometeorological bulletins and warnings. At least **2.5 million** other farmers, herders and public also receive this information through **5** local radio stations.

Customized crop calendars will help Chadian farmers and agricultural sector produce more food © Jake Lyell/Alamy

Malawi

The country's first National Climate Outlook Forum was key to disseminating the 2023–2024 **seasonal outlook** to critical sectors. The forum was also a platform for agriculture, health, and disaster risk management sectors to identify practical solutions for weather and climate services in Malawi.

10-day agrometeorological bulletins based on more comprehensive climate data also provide farmers with early warning information. In a country with 85%[4] of people highly dependent on agriculture, and about **11 million** people employed within the sector, most users in rain-dependent sectors are estimated to have access to weather information to support their seasonal planning.

Sierra Leone

A landmark achievement – a daily weather forecast based on applied meteorological information and knowledge and developed by national forecasters trained with CREWS support.

— It is disseminated to the **8.79 million** national population via radio, TV and the web. With radio the most important mass communication medium in the country, local stations receive the forecast via social media messages from the national Met Service for broadcasting in local languages.

3 https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=TD.
4 https://blogs.worldbank.org/en/nasikiliza/new-pathways-commercialize-agriculture-malawi.

Togo

A productive year with many highlights. A monthly climate forecast for Togo factoring in rainfall fluctuation during the monsoon was the latest product outcome of ongoing CREWS support on sub-seasonal and severe weather forecasting. **The intra-seasonal forecast** is disseminated via TV, radio, social media, and the national Met Service's new website.

2023 also saw about **6.3 million** people – 78% of the population – receive risk awareness information through a campaign carried out in communities in all five regions of the country and other outreach efforts.

Mali: Collaboration to leverage impact

CREWS investment in technical capacity within Mali's hydro-met and civil protection agencies contributed to the development of an early warning and emergency response application – SOS Sécurité. The app – a national platform facilitating exchange and dissemination of early warning and emergency response related information – was initiated by civil protection authorities as part of the Green Climate Fund / World Bank funded Mali Hydromet Project. Nearly 65,500 users had downloaded SOS Sécurité by the end of 2023.

CREWS technical expertise to the project has also supported improved access to forecasts and early warning services for communities, with a particular focus on women's engagement. About 214,000 people have benefitted from a network of community preparedness committees so far. Nearly 89,000 people have also been supported with agrometeorological assistance through another community-based network and local radio for improved weather and climate services.

Highlights from Asia Pacific

Cambodia and Lao PDR

A regional flash flood guidance system covering Cambodia and Lao co-developed with Canadian support for CREWS – had already enabled more accurate and reliable prediction on this hazard nationally since 2022.

In 2023, direct support was given to communities in both countries in addition to national and/or regional contingency or early warning plans. In Cambodia, at least **24,600** people in **3** pilot communities in different provinces are being supported on flood risk management. In Lao, disaster risk management plans are in place for **6,500** people in **15** communities.

— In one Lao village, Soulinh, the plan was followed by community action. To combat the threat to livelihoods as well as lives, villagers set up a community rice bank in a safer place as a fallback during drought and other difficult times. Loudspeakers now alert villagers in an emergency. And to make sure help gets to those who need it most – and first – the most vulnerable people and households have been identified.

Community disaster risk management plans in Lao PDR identified the most vulnerable people so help gets to those who need it most. © UNDRR/Sanjay Pariyar

Pacific Small Island Developing States

Impact tables for different hazards now being used to help Samoan and Tongan forecasters better warn their populations on what potential impact of severe weather could mean for them. Allowing lifesaving, risk-informed, decision-making.

Tropical cyclone seasonal outlooks also improved at regional level for **9** countries and nationally for the Cook Islands and Vanuatu.

An anticipatory action insurance product against tropical cyclones co-developed and piloted among **4** farming cooperatives in Fiji to provide buffer against loss and damage and enable better post-cyclone recovery.

Highlights from the Caribbean

Caribbean

As CREWS' regional project concluded, Jamaica stepped up with new forecasting and warning services for its **2.8 million people**.

— CREWS co-funding of a new mobile weather app developed collaboratively by others including the Jamaican and Finnish Met Services – enables easy access to weather information and warnings, whenever, wherever. With 1-in-2 people using smart phones, more individuals, families and communities can be reached in time before weather and water pose danger.

— Following consultations with fishermen and the marine leisure industry on the app, marine forecasts are now being delivered through a channel they were familiar with – WhatsApp.

Haiti

About **400,000** men, women and children are better prepared and more able to respond to different hazards and emergencies. By raising awareness, providing information and training, and through practical simulation exercises in Port-au-Prince and **4** communities in northwest Haiti. Co-funded with UNDP and implemented with civil protection and others.

Schoolchildren in Haiti's Anse-Rouge testing a school evacuation plan so they know what to do when hazard strikes. © UNDP

Sudan

Rescuing met services in a conflict

Reinstating and strengthening Sudan's hydro-met services will inform humanitarian action to better respond to a 'crisis of epic proportions'. © WFP/Abubakar Garelnabei

The likelihood of conflict erupting in a region well versed to it was strong when CREWS decided to support three Horn of Africa countries – Ethiopia, Somalia and Sudan.

Somalia was already on the World Bank's list of countries with high-intensity conflict. Sudan was institutionally and socially fragile. And by the time CREWS Horn of Africa kicked-off, Ethiopia too was mired in conflict. Weather and climate prediction and warning services were already far below normal situation needs let alone during armed hostilities.

Putting in place hydro-met services and early warning systems where conflict and fragility exacerbate people's vulnerability to hazards is not new to CREWS. Every year, there are more projects and supported countries in the same boat. They continue to operate albeit to different degrees. Sudan, however, is unique.

An armed power struggle in 2023 ahead of the rainy season severely disrupted the Sudan Meteorological Agency's (SMA) ability to provide forecasts and warnings. Violence had forced it to leave the capital at a critical time for food security and disaster response. CREWS operations in Sudan were also put on hold due to World Bank suspension of its activities there.

While SMA's temporary relocation to Port Sudan in the east allowed some met services to resume, these could not meet the needs of a rapidly mushrooming humanitarian crisis. More than 8 million people[1] are displaced so far, and nearly 5 million – about 10% of the population – on the brink of famine.

High political risk and instability in the region had been flagged from the project's offing. Mitigation measures also in case a crisis put a stop to national met services. With that scenario a reality in Sudan, a **rescue plan** was developed with SMA. The goal: restore and augment weather and climate services. And simultaneously contribute to vital humanitarian action.

SMA's temporary office in Port Sudan will transform into an emergency operations centre. It expands and decentralizes national weather and climate services in one go. Placing SMA staff at RSMC Nairobi will improve data management and forecasting capacity now – and for the long run. Collaboration with others will identify what information is needed for different sectors, including disaster response and food security. That will be underpinned by specific training on impact-based forecasting to directly inform humanitarian action.

A rescue plan to make a difference.

1 https://reports.unocha.org/en/country/sudan/.

Governance

58 national plans, strategies and laws on early warning developed with CREWS support and approved so far

- **21** national or regional laws and decrees adopted or adapted by **16 countries** since 2017[1]
- **29** National Strategic Plans and / or Frameworks related to weather and climate services or early action protocols in **26** countries
- **8** national or regional strategies or plans for hydro-met services or disaster risk management

In 2023

- **11 countries** strengthened governance on weather and climate services or social protection through laws, frameworks, and national strategic or master plans

Caribbean

Barbados became the **9th** Caribbean country or territory to adapt to national needs a **Model Law and Policy** developed by CREWS Caribbean.

The Cayman Islands and Turks and Caicos Islands joined **8** other countries or territories to adopt **National Strategic Plans and Frameworks for Weather, Water and Climate Services.**

Such laws, frameworks and national strategies have laid a critical foundation for effective multi-hazard early warning systems and services – a key element of the **regional strategy** developed through CREWS Caribbean. Strengthening early warning governance will also play a key part in CREWS Caribbean 2.0. And a new project being developed through the Green Climate Fund/SAP-CREWS Scaling-up Framework focusing on Trinidad and Tobago and Belize.

Cambodia and Lao PDR

A **National Flood Master Plan** for Lao PDR devised through consultations – and approved by the Prime Minister. Drawing on CREWS-supported risk profiling, it provides a national framework to implement and advance disaster prevention, enable and strengthen coordination at all levels, and facilitate access to flood forecasting and warning information. It also incorporates a thorough overview of river basins in Lao and a plan for operational hydrology and water resource management.

Early action protocols enhanced with a **shock responsive social protection framework** for Cambodia. Government endorsement was followed by the development of an **operational plan** currently under review by the National Social Protection Council.

— 'Shock responsive social protection' aims to support large numbers of people affected by a shocking event via different types of action to help them become more resilient to such crises – before and after they happen.

1 DR Congo, Mozambique, Niger, Togo, Kiribati, Tonga, Tuvalu, Anguilla, Antigua and Barbuda, Barbados, Belize, Grenada, Jamaica, St. Kitts, St. Lucia, St. Vincent and the Grenadines.

Recurrent floods force people to start over time and again. Shock responsive social protection to prioritize those most needing help in Cambodia. © Cambodia Red Cross

Pacific Small Island Developing States

2 more countries in the Pacific took key steps on stronger governance for hydro-met and early warning services.

The Solomon Islands validated a **National Strategic Plan and Framework for Weather and Climate Services**. Vanuatu approved a **Strategic Plan** for its Meteorology and Geo-Hazard department.

— So far, **14** laws, national strategic plans and frameworks have been put in place by 10 countries since CREWS support for the region began in 2017.

Central and West Africa

A **National Framework for Climate Services** and a **Strategic Plan** were validated by the Republic of Congo and Capo Verde respectively. With National Strategic Plans for Burkina Faso in 2019 and Togo in 2023, they mark important progress on strategic governance support in the regions.

Democratic Republic of Congo

A **business plan** validated for national Met Service, MettelSat. It provides mechanisms for the service to improve its long-term financial situation based on equitable cost-sharing of revenues with the civil aviation authority.

— Implementation would improve financial security and sustainability for critical functions such as hydro-met and early warning. This is particularly essential for the conflict-affected country. More than 25 million people need assistance, close to 10 million are displaced, and climate shocks are taking a greater toll on people.[2] Heavy rains and floods from late 2023 alone affected about 2 million people.

Togo

Strategic plan validated for Togo's national Met Service, ANAMET. It follows a 2022 **Decree** making ANAMET a national agency. The strategic plan is to strengthen the agency's institutional capacities with an action plan to develop its services.

A first for Africa

Monitoring tool with methodology developed with CREWS support for **Togo's** National Framework for Climate Services (NFCS) – and **validated**. Training also given. Togo is the first country in Africa to develop a monitoring system for its NFCS action plan. It will allow the development of more strategic climate services for priority sectors e.g agriculture, water, disaster risk and response. CREWS to also support inter-ministerial scientific committee guiding implementation and monitoring of the NFCS and its action plan.

2 https://www.unocha.org/democratic-republic-congo#:~:text=Until%2031%20December%202023%2C%20more,and%20second%20only%20to%20Sudan.

Hazards

17 hazards posing a risk to life and economic loss for which forecasting and warning services are in place through CREWS support[1]

- Through **15** CREWS projects[2] in Africa, Asia Pacific, and the Caribbean

In 2023

- **Flash flood** forecasting and warning enabled in **3** African countries
- **Marine** forecast delivery tailored and channelled to target groups
- **Thunderstorm** forecasting skills improved through 'nowcasting'

Caribbean

Marine forecasts for Jamaica became the latest hazard for which targeted forecasting and warning services were delivered – to small scale fishermen and leisure boats – in response to public and sectoral needs. The forecasts are also partially integrated into ***Jamaica Weather*** – a new weather app launched mid-2023 to make weather and climate information more accessible. Marine forecasting was also strengthened in Grenada in 2022.

CREWS Caribbean, which ended in 2023, supported forecasting and warning services for **6** hazards: **drought, floods, heavy rain, hurricanes, marine-related** and **earthquakes.**

Cambodia and Lao PDR

A visualisation platform for **flood** and **drought** monitoring and forecasting up and running in both countries. The online tool integrates diverse products and information from different sources. It enables trained forecasters to visualize models and other products for better interpretation to develop their forecasts.

Pacific Small Island Developing States

Impact tables to support impact-based forecasting in Samoa and Tonga finalized and being used. They help forecasters provide consistent public protection guidance when issuing forecasts and warnings on what public should know – and do – for their own safety. In **Samoa**, tables covered **5** hazards. In **Tonga**, it was **4**.[3]

Since 2017, forecasting and / or warning services related to at least **9** hazards have been supported in the region. These include **tropical cyclones, flash floods, coastal inundation** and **drought.**

Poster to inform and raise awareness on local names for different winds when developing impact-based forecasts and warnings.
© CREWS/Samoa Meteorological Service

1 Floods, flash floods, drought, strong wind, heavy rain, high and low temperatures, thunderstorms, sand and dust storms, tropical cyclones, landslides, lightening, marine, coastal inundation, high surf/damaging waves, fog, earthquakes and frost. Hurricanes, cyclones and typhoons have been grouped under Tropical Cyclone.

2 CREWS Burkina Faso, Chad, DR Congo, Malawi, Mali, Niger, Sierra Leone ASW, Togo, South West Indian Ocean, West Africa, Afghanistan, Papua New Guinea, Cambodia/Lao PDR, Pacific SIDS, Caribbean.

3 Samoa hazards – strong wind, thunderstorms, flooding, marine and high surf, landslides.
Tonga hazards – strong wind, thunderstorm, damaging swells/waves, drought.

Burkina Faso, Mali, Niger

Flash flood prediction was put into action by joint CREWS national and CREWS West Africa support with the launch of flash flood guidance systems developed for each country.

Burkina Faso also strengthened its **sand and dust storm** warning by semi-automating its production and improving forecast and warning access with a new Norwegian / CREWS supported website.

Chad

The year saw improvements on services for different hazards and specific users. This includes establishing warning thresholds for **heavy rain, strong wind,** and **high/low temperatures.** Decisions on if or when to issue alerts based on these thresholds. A low visibility threshold for sand and dust storms is yet to be determined.

Malawi

Drought and **flood** hazards are now being monitored through online map rooms for sectors. These include climate and agriculture, climate, and water and climate.

Further support for farmers is being provided on both hazards with 10-day agrometeorological bulletins in a country highly dependent on farming.

Sierra Leone

Heavy rains, floods, and **landslide** risk prediction in place or possible with CREWS West Africa and Accelerated Support for Sierra Leone, including through a new daily weather forecast.

Togo

Floods and **severe weather** hazards, such as **heavy rain, strong wind** and **thunderstorms**, are covered via 2 daily rainfall forecasts, heavy rain alerts and monthly climate bulletins. These followed real-time monitoring and forecasting training since 2021, which continues.

Africa-wide

Forecasters from **45** English and French-speaking African countries trained online to use a newly developed nowcasting tool to track rapidly developing **thunderstorms**. Installation of the tool into their national systems will help their analyses when developing thunderstorm forecasts. Countries from all 5 CREWS regional projects in Africa took part – including all 19 from CREWS West Africa.

Ability to track developing thunderstorms among African forecasters strengthened. © Alamy

Afghanistan

A system building public trust in early warning

Warning people in time before a flash flood suddenly strikes literally makes a life-or-death difference. With more than 1,000 flash floods in Afghanistan since 2012, these sudden disasters caused mainly by localized heavy rainfall are among the most destructive weather-related hazards there. Mountainous terrain and steep valleys make Afghanistan prone to flash flooding, particularly its centre and northeast. Heavy rain in such terrain also causes disastrous landslides and mudflows. More than 6,000 people were killed or missing between 2012-2023.[1]

Anticipating flash floods with timely warnings requires accurate rainfall forecasts, and an understanding of what water from heavy rainfall would do in a specific area and how long before a flash flood would occur. Mere minutes in some. Several hours in larger river basins. However, lack of data monitoring in many areas is a hurdle.

Afghanistan's Flash Flood Guidance System (FFGS) launched in 2018 by its Meteorological Department (AMD), with support first from USAID and then CREWS, provided a technical solution. It uses satellite rainfall estimates and hydrological models to help develop warnings.

Nevertheless, flash flood warning is an intricate and pressurized task to correctly forecast where and when sudden floods could occur. Producing specific flash flood warnings was an AMD milestone. In pre-FFGS 2017, **18** warnings were issued compared to **63** in 2018. Lives were still unfortunately lost, but those warnings were about 80% accurate. According to its former Acting Director, Najeebullah Saraj, this "reshaped AMD's perspective on the FFGS, bolstering confidence in its efficacy and impact." 2023 saw the most – **94** – flash flood warnings in a year.

Another challenge was effectively disseminating easily understood warnings. A visualization tool more simply identifying potentially affected areas produce maps with a brief description. These are posted on AMD's website and Facebook account.

Key warning challenge? Easily understandable and accessible warnings disseminated widely.
© Afghanistan Meteorological Department

On-going training for hydrologists and forecasters will help FFGS efficacity. Technical enhancements give more lead time for disaster management authorities on pre-emptive action such as closing schools and diverting roads. For communities, more notice saves lives – and livelihoods.

"These warnings, received through social media, enable us to inform one another and collectively reduce the impact of disasters in our communities. When an alert is issued, we close the shops in the bazaar so fewer people are on the streets,"
says Mr. Faizi, a shopkeeper in busy Jabal Saraj in Parwan Province.

1 Afghanistan's disaster management agency - ANDMA.

Risk

241+ risk data tools / risk products developed or strengthened for early warning or enhanced services since 2017

- Through **18** CREWS country and regional projects[1]
- **7** flash flood guidance systems for **7** CREWS countries in **3** regions in place so far
- **2** drought early warning systems developed

In 2023

- **38** climate risk tools or systems rehabilitated, developed, enhanced, or implemented through **14** CREWS projects
- **73** risk-related analyses, assessments, and information products completed and / or being implemented by **9** projects

A year of concerted flood action

Flash flood guidance systems developed jointly with CREWS West Africa were activated in **Burkina Faso, Mali** and **Niger** once final training on their use was completed. Floods are the most prevalent natural hazard in all three countries, which are also conflicted-affected.

2 regional **flash flood guidance systems** covering all or parts of **Afghanistan** were augmented.

— **2** new components for the Central Asia Flash Flood Guidance System (CARFFGS) that covers the Amu Darya River flowing through northern Afghan provinces. They will enable more accurate and reliable seasonal and sub-seasonal rainfall prediction, river flow gauge, and warnings on riverine and general floods – once hydrologists are trained.

— The addition of a **landslide** module in the Pakistan and Afghanistan Flash Flood Guidance System (PARFFGS) will allow landslide threat and warning for the whole country after training in 2024. Timely and effective warning dissemination will be equally critical for both systems to minimize loss of life.

More accurate and timely flash flood predication and warning are needed to avert disaster from a destructive sudden onset hazard.
© IFRC Afghanistan/Meer Abdullah Rasik

1 CREWS Afghanistan, Burkina Faso, Chad, DR Congo, Haiti, Malawi, Mali, Niger, Papua New Guinea, Sierra Leone ASW, Togo, Cambodia/Lao PDR, Caribbean, East Africa, Horn of Africa, Pacific SIDS, South West Indian Ocean, West Africa.

The implementation of tools and systems to better forecast and warn on floods was accompanied by various analyses and studies produced through CREWS West Africa on urban flood forecasting, flood forecasting systems and scaling up flash flood forecasting. In **Sierra Leone**, the installation of a river gauge was followed by a study on river heights after heavy rainfall to better understand rainfall thresholds that lead to floods.

Outcomes of a CREWS South West Indian Ocean technical study on strengthening design and implementation of accurate flood modelling of **2** river basins in **Mozambique's** Cabo Delgado Province – are informing national hydrology service on best ways to invest in such improvement.

— The two rivers – Messalo and Megaruma – in one of the most populous provinces with 2.7 million inhabitants, have been more flood prone in recent years. The region is also in need of more support on flood knowledge and early warning than others.

In **Togo:**

— **Flood risk awareness campaign** carried out in **42** communities in all **5** regions of the country ensured local awareness of risk.

— Same messages also relayed via local radio while a **programme** on flood risk was disseminated by **18** radio and TV stations. With these initiatives, nearly **6.3 million women and men** received risk awareness information via diverse communication means and channels.

— Work on flood vulnerability maps for the **34** most flood exposed municipalities in the country was also completed by 2023 end. More than 920 maps and 60 explanation notes were also distributed to Mayors, Red Cross branches and others as tools for decision-making on flood risk and response.

Flood vulnerability maps and a flood risk awareness campaign across Togo will help to better protect communities. © Janot Mendler de Suarez/Climate Centre

Full steam ahead for CREWS Cambodia and Lao PDR

2 visualization **platforms** for flood and drought monitoring established for each country with training provided.

— By bringing together many products and information from diverse sources around the world, including its own collected data, the platforms and their resources allow forecasters to cross-check information, visualize, and better interpret models. The end goal – more accurate and timely forecasts and warnings.

2 new or updated national flood and drought **risk profiles** developed for both countries.

Flood markers to help three different pilot communities supported by CREWS in Cambodia. © CREWS/Gonzalo Del Arco Ortiz

Cambodia

A **vulnerability and risk analysis of climate induced hazards** provides a detailed geographical overview of socio-economic vulnerabilities and risks associated with floods and droughts. It will inform who to target and prioritize in early humanitarian action and social protection. Preliminary results validated by 39 representatives from different ministries and development agencies.

A **meteorological, climate and hydrological data management system**. Connected to automatic weather stations around the country and collecting real-time data, it allows the hydro-met services to digitize, store and process vast amounts of data. The system – crucial for monitoring, understanding and predicting weather and climate – will also help Cambodia manage water resources and disaster risk through forecasting and early warning.

3 pilot communities in different provinces with:

— **flood markers** in place. A simple but critical tool for managing flood risk through preparation and early action.

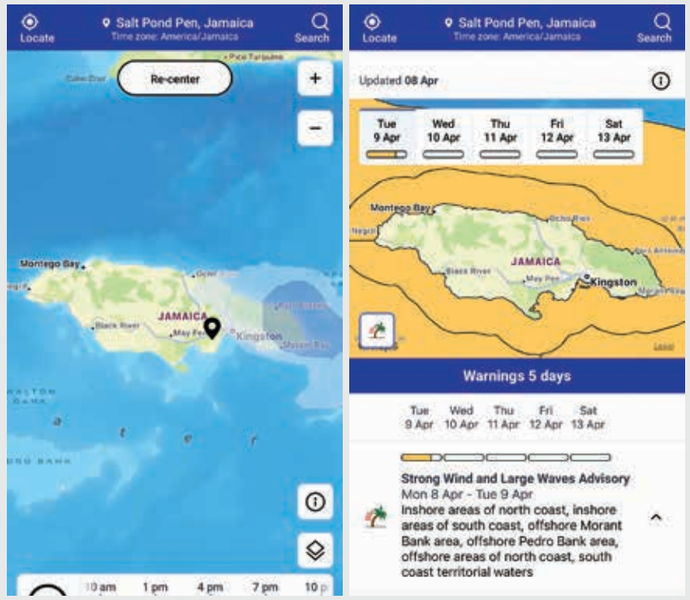
— **digital vulnerability maps** identifying vulnerable homes and hazard zones. Now printed and installed for use by each commune's disaster committee.

Inroads in other key areas too ….

Jamaica Weather – an accessible solution

A smart weather app for people to know what the weather will be – what it will do – and what it could mean for them. Wherever they are in Jamaica. Launched in mid-2023. Downloaded in Jamaica – and around the world.

From hourly to 5-day forecasts and warnings, Jamaica Weather fills a critical alerting gap in the country with its easy-to-access and easy-to-understand warnings. With half the population using smart phones, most-at-risk populations can be more widely reached.



© Meteorological Services of Jamaica

Developed and implemented in a collaboration between the Meteorological Service of Jamaica, the Finnish Meteorological Institute, Resurgence, as well as the Caribbean Climate Innovation Center – and adapted for Jamaica. Funded by CREWS and the Inter-American Development Bank.

"We were able to communicate in a much more understandable way. And then our public was able to act because they recognized not only what event would have impacted them, but they would (also) understand what kinds of impacts to expect and be able to take the necessary action. That was the point of this project. And I think we delivered very well because of the support from CREWS."

Evan Thompson
Director, Meteorological Service of Jamaica

Across Africa

4 national Met Services in different CREWS-supported African countries launched new websites in 2023. Through a Norwegian-led, CREWS co-funded initiative, the websites were developed to ensure 24-hour access to critical weather and climate information that is also easily understood. Together with NORCAP, another **10** websites for East, West and Horn of Africa countries were for launch in 2024 or later.

Burkina Faso's new website allows a direct connection to a sand and dust storm advisory system, and an integrated **editing tool** for the Common Alerting Protocol. It has enabled production of semi-automated warnings, demonstrating a new phase in efforts to reach people and sectors better – and more directly – with critical and timely information.

Togo's website also provides timely, accessible and easily understandable weather and climate information and warnings. Featuring diverse products, and integrated tools to create and edit alert messages and visualize warnings, Anamet-togo.com is a significant step in improving meteorological services to people and sectors needing them.

Meanwhile, a consolidated **platform for agrometeorological monitoring** also developed in Togo with other initiatives, includes indicators to define the start and end of a rainy season. These help Togo's ANAMET to produce agrometeorological bulletins to facilitate direct advice and support to farmers. **4** have been issued since 2022.

The challenge is making sure everyone in Burkina Faso knows when a sand storm is coming. © Ron Giling/Alamy

Chad

New software **INCLICS** developed by Spain's Universitat Rovira i Virgili and training enable Chad to develop **customized crop calendars** by incorporating climate and cultivars specific to certain parts of the country.

— 2023's **crop calendar** was produced using it. The calendar defines onset and end of cropping season for best use of water. In a country where floods, drought and desertification impact agriculture and food security, it's a vital tool for producers.

Malawi

4 map rooms – online climate information portals provide national and local level climate information products to specifically tailored sectors – climate, agriculture, water, and health. Updates in 2023 targeted agriculture and health.

National Met Service's **Climate Data Library** is helping fill gaps on observation and datasets – which also provide the information basis and updates for its map rooms.

Technical **assessment** on the meteorological, climatological, and hydrological circumstances of Tropical Cyclone Freddy provides the Met Service key statistical parameters and indicators to strengthen understanding around rainfall intensity, land and mudslides. And inform multi-hazard early warning system development for Malawi.

— Freddy, the longest lasting and one of the strongest ever cyclones, killed more than 1,200 people in Malawi in 2023 – many in landslides.

East Africa

Beta versions of climate and **risk information repositories** (RiX) developed for all **6** CREWS East Africa countries.

— They bring together national risk information on multiple hazards using geospatial tools to map hazard exposure and vulnerability indicators. RiX aims to help early warning services in disaster risk management and response decision-making and improve early warning and forecasting. Such information, including risk maps to use in generating forecasts and warnings, is largely unavailable in the countries. Training in 2024 will help national services make better use of this information.

Almost all of Somalia was affected by severe drought due to several consecutive years of failed rainy seasons, affecting many millions of people. © FAO/ Arete/ Isak Amini

Horn of Africa

Finalized: A stakeholder mapping for risk assessment and **gap analysis** of early warning services in **Somalia**. It is being used to develop an early warning systems and services roadmap in collaboration with three organizations leading different components of the Early Warnings for All initiative – WMO, ITU and IFRC.

— A disaster loss **database** in place will also support the early warning process in the country.

An **assessment** of hydro-met services in Somalia guided strategic investments to improve hydro-met and early warning services for socio-economic sectors as part of the World Bank's Somalia Crisis Recovery Project (SCRP).

South West Indian Ocean

Early warning **diagnostics** helping to lay early warning foundations:

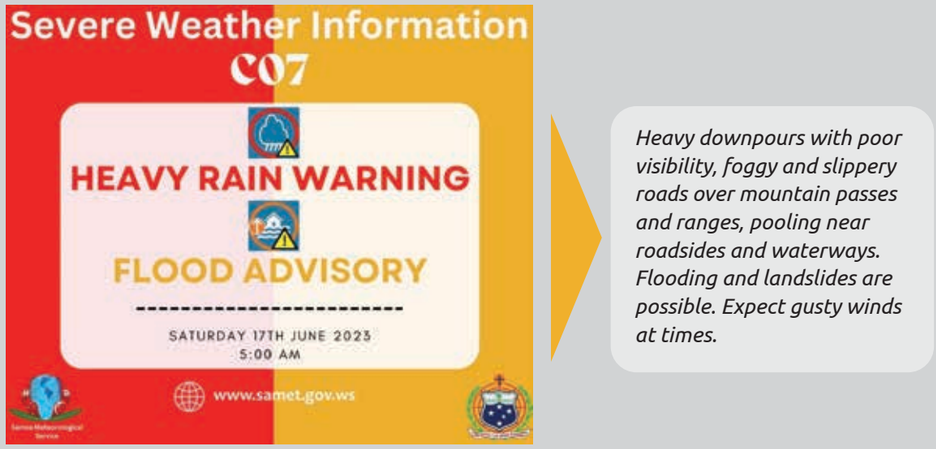
— Regional diagnostic and recommendations on early warning systems performance during 2021-2022 cyclone season provides basis for priority investments.

— **4** country diagnostics for Comoros, Madagascar, Mauritius and Seychelles to inform national early warning systems and services, and disaster risk management activities.

Pacific's diverse ways to reduce risk

16 risk-related tools and products put in place by CREWS Pacific in 2023. Most were related to impact-based forecasting and warning, others targeted specific groups of people. Among them:

- **9 impact tables** for 5 hazards in Samoa and 4 hazards in Tonga. They enable forecasters to help people make risk-informed decisions in the face of extreme weather – when issuing warnings.
  - With ongoing severe weather having already caused floods on Samoa's largest island Savai'i in June, a heavy rain warning and flood advisory on social media said what the weather was – and what **potential impacts** could be.
- **Poster** on wind directions to inform and raise awareness on local names used for different winds in impact-based forecasting and warning products and services in Samoa.
- Findings from **user surveys** on impact-based forecasting in Samoa and Tonga will help improve how warning information is accessed, understood and acted upon. Tonga's user survey resulted in new information on risk decision-making on hazards such as rainfall, wind, floods and storm surges – and better understanding of link between hazard magnitude and impact severity. Impact-based warning service needs were also identified through reports. These ranged from the technical to warning design, communication, access, dissemination and training.
- Guidance and checklist on **gender** and **disability** for inclusive early warning early action to help Met Services and disaster risk entities mainstream both into every early warning element to save more lives through early action.
- An **insurance product** to help Fijian farmers protect themselves and their assets from **tropical cyclones** – piloted among **4** cooperatives.
  - Between 40-100 farmers in each cooperative have taken out the **anticipatory parametric insurance**. Each farmer pays FJ$ 100 to receive FJ$1000 of cover. Payments are activated before tropical cyclone impact based on early warnings and pre-agreed triggers.
  - Part of a range of anticipatory actions **co-funded with Italy**, the insurance scheme was **co-developed** with UN Capital Development Fund and local insurance company, Sun Insurance.
  - **Consultations** with about 150 people from 3 cooperatives identified gaps and needs on disaster preparedness, early warning, and early action.
  - Initial reaction? Product appears well received, with private sector also showing interest. A similar product for Solomon Islands covering **rainfall** is in the offing. Consultations to take place in Samoa in 2024.



Impact-based flood warning for Samoa's Savai'i island issued via social media. © Samoa Meteorological Service

Forecasting

105+ forecasting and prediction products developed and / or tailored to user needs

- Through **15** CREWS regional, national or accelerated support since 2017[1]

In 2023

- **19** products developed or tailored for use
- to better inform and protect **105.7 million** people in **11** countries
- from at least **9** hazards
- **10** CREWS countries with improved seasonal tropical cyclone forecasting or weather forecasts

Flash Flood Forecast Threats

The 2023 launch of **flash flood guidance systems** (FFGS) in **3** West African countries and enhancing **2** regional systems covering Afghanistan marked an early warning step change for CREWS – on one of the most destructive sudden-onset hazards.

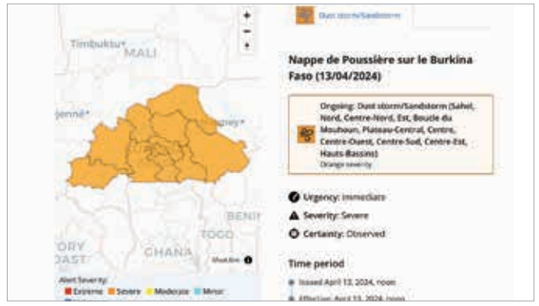
FFGS for **Burkina Faso, Mali** and **Niger** – funded jointly by **CREWS West Africa** and CREWS projects in each of the countries – ensures more effective prediction of this hazard.

A first review of an operational FFGS in Mali using a flash flood event in Bamako in May 2023 showed it had made the grade. It found Mali Météo had correctly anticipated the flash flood and in good time. An **alert** had been issued via various social media channels and traditional media – and **loss of life** had been **avoided**.

New forecasts and warning services on other hazards

Burkina Faso

CREWS West Africa support to Burkina Faso to connect a **sand and dust storm** advisory system to the national Met Service website and integrate an editing tool for the Common Alerting Protocol – led to semi-automated **warnings**.



Sand and dust storm warning on Met Service website provides visual and textual information on scope, severity and duration of hazard. © ANAM

Sand storm in Burkina Faso. © Ouoba Yempabou Ahmed/2022 WMO Calendar Competition winner

1 CREWS Afghanistan, Burkina Faso, Chad, DR Congo, Malawi, Mali, Niger, Papua New Guinea, Sierra Leone ASW, Togo, Cambodia/Lao PDR, Caribbean, Pacific SIDS, South West Indian Ocean, West Africa.

Chad

Warnings are now being issued on **heavy rain, strong wind,** and **high/low temperature.** This follows the setting of warning thresholds on these hazards. With standard operational procedures still to be put in place, these thresholds set the benchmark for when alerts can be issued.

Malawi

In a first for Malawi, a National Climate Outlook Forum (NACOF) disseminated the 2023-2024 **seasonal outlook** to 80 representatives from sectors such as **agriculture, health** and **disaster management,** the media, and the national Met Service. The outlook became the basis for **sector specific seasonal forecasts,** including information on predicted drought and dry spells up to district level. Information provided at NACOF was also relevant for supporting disaster risk management and contingency planning activities.

10-day agrometeorological bulletin that takes less time to produce with a **Climate Data Library.** Using data from blended satellite and rain gauge stations, the bulletins make early warning information available to farmers and the agricultural sector for timely decision-making. More than 8 in 10 people in Malawi are dependent on agriculture.

With most of Malawi suffering from drought-induced disaster, agrometeorological services are especially critical. © UNICEF/Thoko Chikondi

Togo

Intra-seasonal climate forecasts joined a suite of 6 other forecasting products developed with CREWS support in Togo. The result of ongoing support and upskilling of forecasters on real-time monitoring and forecasting since 2021, the monthly forecasts divided into weekly periods, cover **heavy rain, temperature,** and **dust or dry winds.** They are crucial for agriculture and water resource management. Technical support during their development has helped improve at least 4 other products: **daily, 3-day, 5-day,** and **seasonal forecasts.**

In a fruitful year for CREWS Togo, **2** more **agrometeorological bulletins** were produced as a direct result of operational training. **23 alerts** were also issued by civil protection on rain and possible floods, highlighting how improved flood monitoring and forecasting is enabling better flood risk management in the country.

Farmers were further supported through preparation and dissemination of **forecast results** on agricultural, water and climate conditions of the short rainy season in southern Togo.

— The results, shared via user-centric workshops in Badou with at least 330 farmers, agricultural advisers, and media enabled timely and appropriate action for a successful cropping season. The workshops encouraged widespread dissemination of the forecast to improve yields in a mostly coffee and cacao cash crop cultivation area. And to cut loss and damage from floods and severe weather. Spreading word this way is part of the Met Service's direct approach to supporting service users and getting the media to pass on vital weather and climate information to the public and sectors.

Sierra Leone

Daily weather forecast replaced with new improved format, presentation – and content. The forecast is now based on applied meteorological knowledge instead of online weather information, thus more reliable. That's due to meteorological training and standard operational procedures on forecast preparation – now established.

Landslide prediction possible through new daily weather forecast. © IFRC

Caribbean

In a busy and exciting year for Jamaican Met Services:

- Marine forecasts for small fishing and leisure boats became a new **direct** service. Its need identified during consultations with communities and sectors on development of another product – the *Jamaica Weather* app. Age demographics of fisherfolk and mariners meant accessing marine forecasts had to be through existing and familiar channel – not a smart phone application. The outcome? They chose – and now receive – their marine forecasts through WhatsApp.
- Some of the marine warning information is nevertheless included on *Jamaica Weather*. Hourly weather forecasts, 5-day forecasts, and 5-day severe weather warnings have been **tailored** for use on the application.

Pacific Small Island Developing States

National **tropical cyclone seasonal outlooks** for 2023-2024 developed for the Cook Islands and Vanuatu during training that also strengthened tropical cyclone forecasting of the Regional Special Meteorological Center Nadi. The result? Improved **regional tropical cyclone seasonal outlook** covering **9** CREWS Pacific SIDS countries.

Impact-based warnings drawing upon impact tables developed with CREWS support now being issued by Samoa and Tonga.

Tuvalu

Upgrading the coastal inundation forecast system has enabled customized ocean products for major development projects. © UNDP/TCAP

Coastal inundation system offers new means

A nationwide wave and inundation forecast system put in place with CREWS support in Tuvalu has opened a world of new possibilities for its Meteorological Service (TMS).

The system predicts coastal inundations such as storm surges and high tides – and assesses their impact on coastal communities and infrastructure. For 12,000 people in 2022, it had already proved its worth from the start by informing warning messages issued by the Met Service during Spring tides. For a low-lying island nation in the Pacific threatened with rising sea levels and climate change, such tides exacerbate perennial issues of coastal erosion, flooding, and saltwater contamination of fresh water. A heads up can make all the difference to minimizing threat to lives and livelihoods.

The CREWS-supported system has now been enhanced through other projects and by multiple entities including the Green Climate Fund, UNEP, UNDP and the WMO. A new module developed by the Pacific Community (SPC) and integrated into the system, autogenerates high resolution tailored ocean forecast products. These have enabled TMS to provide an unrivalled ocean and warning service for the country that has also brought new opportunities for public-private engagement.

The enhanced system and training provided by partners including CREWS, has enabled the Met Service to offer customized ocean forecast products to Hall international. For the company, contracted for coastal development work such as reclamation, wharf and coastal protection across various islands in Tuvalu, products providing information on underwater topography and water depths as well as timely warnings on hazards, are critical for its business. For Small Island Developing States, being able to generate income by providing strong, high-quality ocean and early warning services that are as commercially valuable as they are publicly – is priceless for sustainability in a remote part of the world.

Preparedness

87+ Standard Operating Procedures (SOPs), operational preparedness and anticipatory action plans linked to prediction and warning services

- Developed, updated, put in place through **10** CREWS projects since 2017[1]

In 2023

- **6** new national or sectoral flood, disaster management or emergency response plans developed and in place
- Targeted community plans or actions carried out in **6** countries

Laying strong foundations with standard operating procedures

Putting in place SOPs for **Sierra Leone's** national Met Service was fundamental to improving the quality, effectiveness, and reliability of meteorological services in the country. Follow-up training was given to help ensure SOP application, including on operational routines to embed the procedures.

— This will be particularly key following the creation of an operational **Flood Risk Task Force** bringing together experts from Sierra Leone's meteorological, water resources and disaster management services to jointly assess flood risks. Floods are the most prevalent hazard in the country, particularly in the capital, Freetown.

Model SOPs developed for the **Caribbean** region through CREWS Caribbean had, by the following year, seen **4 countries** initiating steps to adapt and adopt them at national level: Antigua and Barbuda, Bahamas, Barbados and Trinidad and Tobago. Strong forecasting and warning services underpinned by SOPs for quality assurance and efficiency are critical in one of the most disaster-prone regions in the world.

Sierra Leone's capital, Freetown, built on high-risk slopes and regularly disrupted by flash floods. © IFRC

1 Chad, Haiti, Mali, Niger, Sierra Leone ASW, Togo, Cambodia/Lao PDR, Caribbean, Pacific SIDS, South West Indian Ocean.

Communities and countries prepare against flood impact

Cambodia and Lao PDR

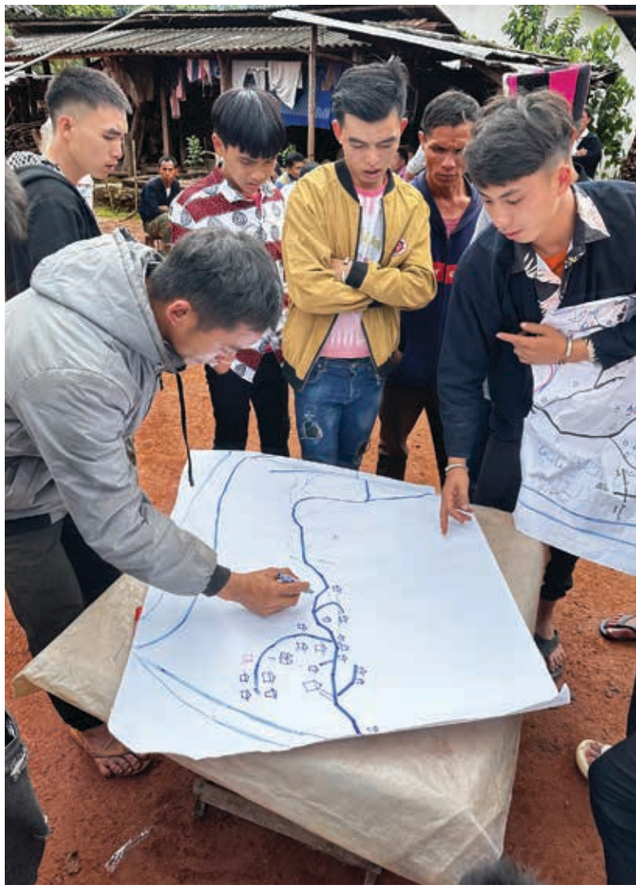
1 national flood contingency plan updated and endorsed for **Cambodia**. It followed the result of a national simulation exercise in March 2023.

6 provinces along the Mekong River and Tonle Sap Lake supported in updating **regional emergency preparedness and response plans.** Via interactive workshops, Provincial Committees for Disaster Management in Kratié, Stung Treng, Battambang, Pursat, Kampong Chhnang, and Ratanakiri, identified necessary capacities, resources and coordination mechanisms for their updated plans to succeed. Following this, the national disaster management committee helped all 25 Cambodian provinces to update their contingency plans according to a standardized format.

3 community-based flood management committees established in pilot areas and **91 people** empowered to help their communities better manage disaster risk and response through training. It focused on small-scale flood mitigation measures to build self-help capacity in each community, including first aid.

15 community-based **disaster preparedness and response plans** identifying risks and key measures to counter them – developed and validated in **Lao**. This followed disaster risk management training for **809** people from communities, local committee members and government officials – 213 of them women – from 15 target communities in Phongsaly Province.

Tailored communication products will help distribute the plans to the communities via diverse channels in 2024.



Community members co-develop disaster preparedness and response plans in Lao PDR. © UNDRR/Sanjay Pariyar

Togo

2 national plans updated in 2023 – on flood preparedness and response, and disaster risk reduction.

3 risk assessment and rapid evacuation plans developed for a regional hospital centre, a market, and a school. They identified elements needed for appropriate emergency response and preparedness. Altogether, 15 such plans developed with CREWS Togo support since project began.

Improving food security with targeted early warning dissemination

Chad

Agreements with **3** community radio stations in Bongor, N'Djamena, and in Karal ensure **dissemination** of customized **10-day agrometeorological bulletins** and **daily weather forecasts** and **warnings,** with procedures.

— Another **2** community radio stations already given CREWS agrometeorological training for media, disseminate the information without contractual obligations. Population covered by the 5 radio stations – **2.5 million people**.

— Direct **outreach** involving **1774** people in pilot areas ensures their responsiveness to warnings and climate and weather information.

Getting weather and climate information such as agrometeorological bulletins directly to farmers in Chad is as critical as putting the information together. © Ton Koene/Alamy

Mali

CREWS expertise and training support to a GCF/World Bank Mali Hydromet Project has **leveraged** greater engagement of women in community disaster preparedness and response committees (SCAP-RU). These support local communities by improving women's and men's access to forecasts and early warning services for better food security. By 2023 end, 91 active committees were serving nearly 214,000 people.

CREWS collaboration with the Mali Hydromet project has also enabled agrometeorological information to reach local communities more directly. Agrometeorological support groups established or strengthened by Mali Météo help disseminate forecasts and warnings. With 36 such groups – 6 new or revitalized in 2023 – another **88,700** people can take informed and timely action for their security.

Operational plans for any eventuality

South West Indian Ocean

Seychelles' disaster management agency supported to operationalize **national integrated emergency management plan – NIEMP**. The plan incorporates early warning and early action into disaster management cycle. NIEMP's finalization followed by several rounds of training. **78** decision-makers from diverse ministries and senior disaster risk management officials **trained** on respective roles and responsibilities for emergency preparedness and response in national and district plans.

— National emergency response **plans for ports and airports** were also approved and followed by simulation exercises (**Simex**) to test and validate the plans. Simex identified gaps in coordination capacities between disaster response agencies. A State of Disaster in December 2023 confirmed Simex findings, now incorporated into recommendations for action.

Haiti

In the crisis that is Haiti, it pays to be prepared. For different hazards. And all ages.

— Support was provided to civil protection to update **municipal contingency plan** for Anse-Rouge.

— **Evacuation plan** for schools in Anse-Rouge covering 15% of schoolchildren was tested.

— Civil protection committee members from **4** communities – Anse-Rouge, Gonaïves, Gros-Morne, and Terre-Neuve – trained in **disaster response planning and response**, **emergency operations centre management**, and emergency management simulation with CREWS and UNDP support. The training, carried out by civil protection, UNDRR and local partners, strengthens early warning collaboration to better protect, particularly the most vulnerable.

— Children from 5 schools in Port-au-Prince made aware of the risks and dangers of hazardous situations through an **information campaign**. And of what they need to do – to stay safe.

Schoolchildren now know what they can do to better protect themselves from different types of hazards. © UNDP

Anticipatory action – in action

Pacific Small Island Developing States

Anticipatory actions initiated to better connect early warning to early action in the Pacific and co-funded with Italy.

- 3-day and 5-day **early warning messages** on tropical cyclones developed for **Fiji** with different sectors, including civil protection. The aim: ensure specific groups receive targeted information well ahead of a predicted tropical cyclone. Warning messages will be issued by national hydro-met and disaster management agencies and local governments. Social media, radio, and TV to be used to reach as many people as possible.
- The messages fall within a Tropical Cyclone Anticipatory Action Framework for Fiji developed by the government and the UN. The framework establishes pre-agreed triggers to set in motion pre-financed action carried out by government and non-government agencies.
- Awareness raising on anticipatory action is part of continued engagement with national governments on this and early warning systems. 50 government officials, NGO and UN representatives in **Samoa** and 70 in the **Solomon Islands** were reached so far. Need for coordination and knowledge sharing on the issue led to the creation of the **Anticipatory Action Community of Practice** (AA CoP), with expertise and coordination jointly provided through CREWS support.

Early warning messages disseminated widely ahead of anticipated cyclones will help reduce loss and damage in Fiji. © UNDP/Romain Desclous

Alerting

18 countries adopting the Common Alerting Protocol (CAP) with CREWS support and issuing warnings

- **17** countries were in Africa – mostly west and central[1]
- **Belize** is the only CREWS CAP-supported country outside of Africa to use it
- Altogether, **47** countries in CREWS projects have received CREWS support on CAP since 2022

30 in Africa **14** in Asia Pacific **3** in Caribbean

In 2023

- **207** alerts in CAP format were issued by the 18 countries
- **4** CREWS Central Africa countries issued **52** alerts between them – Cameroon, Congo, DR Congo and Gabon
- Some countries such as Chad, Nigeria and Togo are either in testing mode or are unable to fully implement without the development of operational procedures
- Of **30** countries trained on CAP in late 2023, **12** were from CREWS Pacific SIDS and **2** from CREWS Horn of Africa – Ethiopia and Somalia

Caribbean

3 countries in the Caribbean region enabled to use CAP with CREWS support – Antigua and Barbuda, Belize and the Turks and Caicos Islands. Only Belize is using CAP for warnings. It issued at least **8** alerts in 2023. Almost all were for cautions or warnings for small (water) crafts.

Using CAP to disseminate warnings should help reach more people with timely information in the Turks and Caicos Islands and other Caribbean countries when hurricanes hit. © UNICEF/Manuel Moreno Gonzalez

1 Benin, Burkina Faso, Cameroon, Chad, Congo, Côte d'Ivoire, DR Congo, Gabon, Ghana, Guinea, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, Togo, Belize.

Africa

Togo issued **3** alerts in 2023 for **heavy rain** and localized **strong wind**, although it is still in testing phase. Its very first CAP alert was in December 2022.

— The integration of a CAP editor into the new website of its Met Service – ANAMET – streamlines and standardizes the creation and content of alert and warning messages for dissemination across diverse channels. Following more training, this will enable more effective communication for better crisis outcomes.

Niger, where CREWS completed a project in 2022, began using CAP. **8** alerts were issued – 7 related to heavy levels of airborne **dust**. Niger is one of 7 West African countries using a sand and dust advisory system implemented with CREWS support.

Others such as **Burkina Faso, DR Congo,** and **Mali**, for example, issued far fewer alerts than in 2022 – 22 in total between them.

— In DR Congo – which put out **one** alert using CAP during the year, compared to 8 in 2022 – full implementation is hampered by various issues. These include internet access, the lack of understanding among end users and public on how to interpret alerts, and the need for skills development on severe weather forecasting. The latter is being offset for the moment by support from RSMCs Pretoria and Dakar. The regional specialized centres provide guidance products for anticipated severe weather phenomena over Southern African Development Community countries (SADC) and Central Africa.

These four countries using CAP, along with **Cameroon**, are all affected by conflict. Cameroon nevertheless issued **26** alerts, all but four of them related to **strong wind, heavy rain** and **thunderstorms**.

All of **Côte d'Ivoire's 28** alerts were rain related and notable for precising exactly which areas of the country were affected.

Most of Cameroon's alerts using CAP in 2023 were related to storms and heavy rain. © WMO Calendar Competition 2024/Erica Pém

Capacity

11,000+ people with specialist / targeted training and applying strengthened forecasting / early warning skills and knowledge

- Through **18** CREWS projects or regional initiatives since 2017[1]

In 2023

Cambodia and Lao PDR

Training at least **1137 people** in Cambodia and Lao PDR since the 2021 project kick-off has already made important inroads in flood forecasting and early warning. And on better protecting communities and vulnerable people through risk mapping, contingency planning and anticipatory action to minimize loss and damage from floods and other hazards. Much of this human investment was in 2023.

— More than **90** Cambodian and Lao hydrologists with new or more skills on flash flood, drought, severe weather and impact-based forecasting, dynamic water resource management, and the Common Alerting Protocol.

— Lao government officials can now develop near time reports by taking a 72-hour approach to data gathering on disaster loss and impact. Improved data quality means more comprehensive disaster response assessments and operations design.

— Significant strides made on emergency preparedness and response at national, regional and communal level by training government officials, community leaders and members. In Lao PDR, support for and engagement of **809** people including officials, resulted in disaster risk management plans in place with action points for **15** communities. In Cambodia, **3** pilot communities know what to do to prepare for and respond to floods.

Training of more than 800 people, mostly from 15 communities in Lao, ensured they were fully involved in developing disaster management plans for their communes. © UNDRR/Sanjay Pariyar

1 CREWS Afghanistan, Burkina Faso, Chad, DR Congo, Haiti, Malawi, Mali, Niger, Papua New Guinea, Sierra Leone ASW, Togo, Central Africa, East Africa, South West Indian Ocean, West Africa, Camodia/Lao PDR, Pacific SIDS, Caribbean.

Afghanistan

10 forecasters from Afghanistan's hydro-met services and a Ministry of Agriculture official with skills to issue more timely and accurate **flash flood** warnings.

— Training on using diverse products in the Pakistan and Afghanistan Flash Flood Guidance System (PARFGGS) built capacity on determining flash flood situations and necessary action. Passing on these skills to colleagues will enhance PARFFGS sustainability. CREWS Afghanistan has trained 515 people since 2019 – despite being largely on hold since the Taleban took power in 2021.

Pacific Small Island Developing States

Tropical cyclone seasonal forecasting training for the **Cook Islands, Vanuatu** and the Regional Specialized Meteorological Center Nadi, resulted in **tropical cyclone seasonal outlooks** for both countries.

Training for **57** people from **27** organizations in the **Solomon Islands** led to agreement on a draft framework to govern the implementation of Impact Based Forecasting and Warning Services (IBFWS) in the country. In **Samoa** and **Tonga**, **85** government officials received a range of training related to impact-based forecasting – from conducting user research to disseminating and communicating on such forecasts.

First **Pacific Anticipatory Action Meeting** in Fiji with at least **80** people from hydro-met services, national disaster management offices, and local organizations, including those for people with disabilities.

The goal: strengthen knowledge and expertise on key building blocks of anticipatory action such as early warning and trigger development, pre-agreed activities, and pre-arranged financing. Organized with the UN and Council of Regional Organizations of the Pacific (CROP), it **resulted** in diverse anticipatory action initiatives in the region. Among them, a pilot anticipatory insurance product for Fijian cooperatives.

Haiti

Implementation of 2022-adopted **National Strategic Plan** moved ahead in the face of heightened insecurity in Haiti. Through 5 workshops:

— **157** people from different sectors and regions, including 20 women, trained on **interpreting hydro-met information**. The aim is to increase preparedness and response abilities of disaster risk management actors, strengthen food systems for sustainability, resilience and inclusiveness, and identify gaps in national hydro-met services.

— **17** forecasters recruited and trained by Haiti's hydro-met service (UHM) and the National Office of Civil Aviation (OFNAC) to fill crucial capacity gaps for better forecasts and warnings. More training needed.

2250 school children in Port-au-Prince know what to do in the event of various hazards through outreach. Another **407** members of community civil protection committees in **4** other areas better prepared against crises through training or simulation exercises in disaster response planning, emergency management and response. CREWS Haiti has trained **2832** people so far through **8** capacity building programmes.

Simulation exercises among four communities in Haiti to ensure they have skills and knowledge on what to do in crises. © UNDP

Chad

Training in 2023 for **186** technicians, officials, farmers and media – of **405** so far – made progress on some issues, led to outcomes on others.

— Chad's **5** national institutions for hydro-met services, civil protection, rural development, and food security and early warning agreed on an action plan to develop joint **operational procedures**. It followed a workshop where warning level thresholds were established for **heavy rain, strong wind** and **high/low temperatures**. Until operational procedures are developed, warnings are issued based on set thresholds.

— New software training led to a **customized** crop calendar produced by the national Met Service that includes crops only found in certain parts of Chad. Likelihood of more successful harvests for small-scale farmers and the agricultural sector – increased.

— **101** farmers, rural development agency staff and meteorological observers trained on **agrometeorological monitoring** at one pilot site – Bongor. Such knowledge is increasingly critical in a country where crop yields are predicted to fall due to a hotter and drier climate. Training **14** media on **disseminating** agrometeorological bulletins and weather forecasts will help more farmers access that information for better farming outcomes.

Malawi

In its first full year, augmented skills and knowledge of **85** people from the national climate change and meteorological service (DCCMS) already making an impact.

— Staff from national and regional offices can now use an automatic weather station data tool fundamental for **real time monitoring** of floods, drought, and other climate hazards impacting diverse economic and public sectors. Training of **48** new technicians on basic weather observation and instruments enhanced DCCMS' observation ability. Some of those technicians went on to provide content for WMO's ***State of the Global Climate Report 2023***.

— Capacity building on an open-source climate data tool ensures **quality control** of observations and enables data visualization and analyses important for tailoring and communicating climate information. It has already helped reduce turnaround time for producing **agrometeorological bulletins.**

— Staff also trained on maintaining and using **map rooms** – online portals developed to make climate information products more easily available. DCCMS' suite of map rooms was updated to add new products for **agriculture and health.**

Mali

Annual training before rainy season onset and weekly briefings throughout continues to enhance understanding of convective systems. It also enables the production of more **accurate and reliable forecasts.**

— More than **30** forecasters and hydrologists have developed or strengthened capacity on **flash flood** guidance, weekly, monthly, and **severe weather** forecasting, **crop calendars**, and **data** collection and management with direct support from CREWS since 2017.

Meanwhile, CREWS' expert support to the Mali Hydromet Project on involving women in community-based disaster management and early warning initiatives, saw **450 people** – **127 women** – from a network of local disaster preparedness committees (SCAP-RU) and **525** local agrometeorological support committee members (GLAM) – trained in 2023. A particular focus? **Strengthening women's role** in these, including on disseminating warnings to women.

Collaboration between the two projects has trained **2153** people to date – largely experts from hydro-met, food security and civil protection services.

Sierra Leone

Training of **35** people – including 9 women – through **10** capacity building initiatives from basic meteorology to flood forecasting, warning and communication, has already delivered a milestone in Sierra Leone.

— The **daily weather forecast** is now based on applied meteorological knowledge using standard operational procedures – instead of online weather information. Improving accuracy and reliability.

Togo

Ongoing training for **5** meteorologists from national Met Service – ANAMET – directly led to a new product in 2023 – a **monthly forecast**. This technical support since 2021 has also helped improve other forecasting products such as **daily, 3-day, 5-day**, and **seasonal forecasts.**

Similarly, further training and continued technical support during the development of **2** more **agrometeorological bulletins** and **drought monitoring** in 2023 has improved the quality of information provided. Users say they can better understand the information. The training has also led to more forecasts and warning alerts.

East Africa

Quick off the mark after launch of CREWS East Africa, **21 forecasters** from all 6[2] project countries and Ethiopia with more severe weather forecasting skills and knowledge. Training – also covering impact-based forecasting – attended by hydro-met staff from Djibouti, Eritrea, Somalia and Sudan as well.

Training in forecasting severe weather and its impact should lead to more accurate prediction and timely warning.
© Kenya Red Cross/John Bundi

2 Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda.

Southwest Indian Ocean

Nearly **200 people** trained in 2023.

— 110 people – 68 men and 42 women – from different government ministries, departments, and agencies in **Madagascar** were among those trained in disaster risk reduction, multi-agency coordination, and utilising early warning to inform effective early action. To prepare for cyclone season, 2 workshops also included local warning dissemination, communication arrangements and early action plans. Of 66 weather-related disasters in Madagascar since 2000, 49 have been caused by tropical cyclones.[3]

— Simulation exercises in multi-agency coordination involving 47 men and 31 government officials from different ministries and agencies in the **Seychelles** – enabled testing and validation of newly developed national port and airport emergency plans.

Malagasy Red Cross mapping needs among vulnerable populations before coordinating with local authorities and partners.
© IFRC/Caren Ramanantoanina

— First training through CREWS also on marine services for **Comoros, Mauritius** and **Mozambique.**

West Africa

Last of **3** trainings for hydrologists from Burkina Faso, Mali and Niger enabled the operationalization of **flash flood guidance systems** in each country.

Forecasters from **13** English-speaking countries trained to use marine forecasts for their oceanic area and translate them into **local bulletins and warnings.**

Africa-wide training for greater reach and impact

130 forecasters from

45 English and French-speaking African countries

35 countries from CREWS regional projects in Central, East, Horn, South West Indian Ocean and West Africa

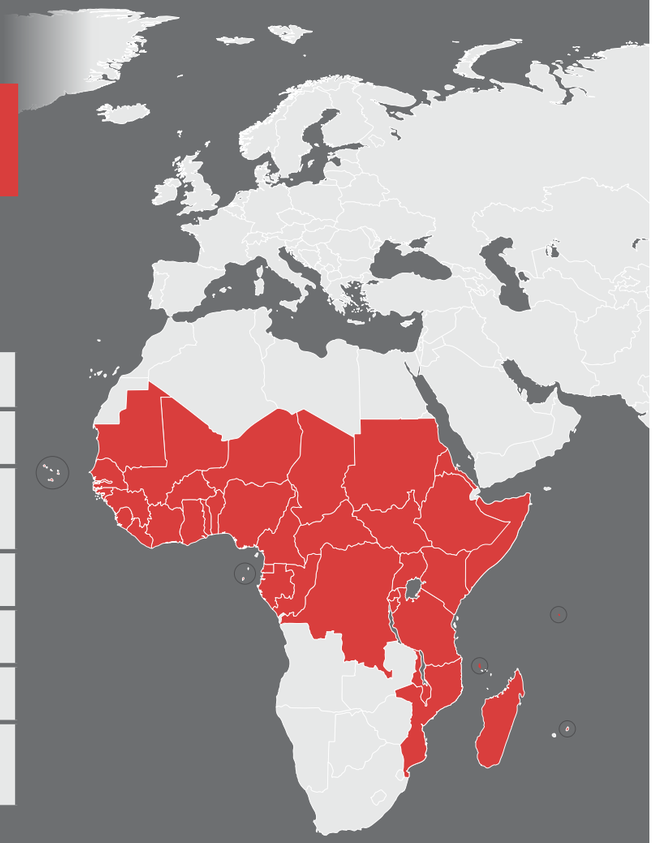
All trained online in *'nowcasting'* using EUMETSAT satellite products

Goal: Improve short-range forecasting of **severe weather** and **high impact events**. In particular, anticipate and track rapidly developing **thunderstorms**.

Training in collaboration with Spanish and Moroccan Met Services, WISER, and others.

3 EmDAT download 24 April 2024.

CREWS in Africa



- **40** countries assisted in 2023
- **11**[1] countries conflict-affected
- **6**[2] countries with social/institutional fragility
- **5** regional programmes
- **6** country programmes
- **2** accelerated support interventions
- **$46.87 million** programme funding to date

> Efficient early warning systems are crucial to save lives, properties, and yields. Norway is very happy to come on board as a supporter of CREWS. It plays a crucial role in meeting the goals of the Early Warnings for All initiative, bringing life-saving weather forecasts to affected populations.
>
> **Anne Beathe Tvinnereim**
> *Minister of International Development, Norway*

1 From 2023 World Bank list: Burkina Faso, Cameroon, Central African Republic, Democratic Republic of Congo, Ethiopia, Mali, Mozambique, Niger, Nigeria, Somalia, South Sudan.

2 Burundi, Chad, Comoros, Congo Republic, Guinea-Bissau, Sudan. In 2024, Sudan was added to conflict-affected list.

2023 developments

Benin

Accelerated support for Benin has been extended to 2024. The intervention aims to develop a roadmap for stronger early warning by systems, an investment plan, and training in key areas. At local level, collaboration has begun to agree on how best to help communities adapt or be supported on emergencies.

Burkina Faso

From building hydro-met capacity and skills to producing forecasts and warnings for people and sectors – CREWS Burkina Faso is now focusing on effective communication and dissemination of its forecasts and warnings. With a new website and tools to turn forecasts into warnings when needed, work has started under a World Bank / GCF project to develop a platform that automates the creation of different meteorological products. It would enable more efficient generation of meteorological products – including warnings.

Chad

A **strategic plan** completed for national Met Service, ANAM. Validation by its board in 2024.

Flood early warning system for Ndjamena developed. Testing and implementation planned for 2024.

Chad trained on using the Common Alerting Protocol and issuing some alerts, but operational procedures still need developing before full adoption.

Democratic Republic of Congo

An extension until mid 2025 was approved as was a realignment of the project given the political and operational challenges in the country. CREWS DR Congo will now focus, among other things, on improving risk knowledge through hazard and risk assessments, mainly in the city of Kananga. In parallel, national weather forecasting and hydrological services improvement will continue.

A rescue. Continued investment in DR Congo's weather forecasting and warning is needed. © MONUSCO

Malawi

Cyclone Freddy an impetus for early warning

Malawi has faced many weather-related disasters in recent years. But Cyclone Freddy which hit southern Africa in early 2023 was one of its worst. This tropical cyclone with dubious claims to fame – the longest lasting and among the deadliest ever – took its largest toll on Malawi. More than 1200 people were killed and nearly 700,000 displaced. It could have been far worse. A multi-institution post-Freddy assessment commended the effectiveness of Malawi's local-level response.[1]

Cyclone Freddy - the longest lasting and among the deadliest ever – took its largest toll on Malawi.
© WFP/ Badre Bahaji

Landing shortly after CREWS Malawi started, Freddy became an impetus for urgent action and change. It triggered a national rethink on coordinated multi-agency early warning needs and priorities.

A revised Disaster Risk Management (DRM) Bill was enacted and came into force in November. It establishes stronger DRM and early warning structures at national and local level. It also shifts government focus from civil protection after an emergency to end-to-end disaster management: From risk and preparedness to response and recovery.

Implementation – particularly of structures created by the Act – needed better understanding of what was in place, working, and where gaps lie. CREWS Malawi offered an opportunity to push forward on various critical areas.

A diagnostic on early warning and hydro-met services was done at the request of a newly created National Disaster Committee responsible for multi-hazard early warning system (MHEWS) development. Identified risk knowledge gaps and challenges informed the subsequent CREWS development of a MHEWS roadmap and investment plan to ensure warnings reach more – and broader – groups of people.

A National Integrated Emergency Management Plan to provide a framework for coordinated activities across levels of government is also being devised.

Other requests encompass finalizing a National Framework on Climate Services and including water in the strategy before monitoring its implementation; more support for forecast products; and helping Malawi adopt the Common Alerting Protocol. The latter would seek to leverage digital platforms for greater reach and impact of early warnings.

CREWS Malawi's responsiveness to national requests underlines the country-led principle of CREWS support. And reiterates its programmatic ability to adapt in the face of rapidly changing needs. Values to support Malawi's EW4All goal in coming years.

1 https://www.preventionweb.net/news/impacts-and-lessons-tropical-cyclone-freddy

Mali

Ongoing and widespread insecurity continued to hamper CREWS Mali progress. The project, which should have ended in June 2023, has now been extended to the end of 2024.

Mozambique

Completed **accelerated support** for **Mozambique/SADC** in 2022 saw further uses. A ministerially endorsed blueprint for integrated early warning and action in the Southern African Development Community countries was incorporated into a regional action plan on Multi-Hazard Early Warnings for All. Followed by agreement within Mozambique on key action such as expanding the national observation network, strengthening the legal framework, establishing regional forecast centres, and on early warning communication and dissemination.

Sierra Leone

A **flood guidance system** for Freetown developed through **accelerated support** was piloted during the 2023 rainy season and outputs shared daily with national hydro-met and disaster management agencies. The testing provided valuable insights, including on communication approaches. The system needs further work before it can become the basis for a reliable public-facing flood forecasting and warning system. Without an adequate observation network for Freetown and building sufficient skills and knowledge, developing a dependable system for the city – heavily exposed by regular flash floods and landslides – poses significant challenges.

Togo

A mid-term review of CREWS Togo found the technical and operational capacity of the country's hydro-met and civil protection agencies had improved through support of qualified expertise at national, regional, and global level. The review identified stronger weather and climate forecasting processes, with national Met Service, ANAMET, seeing a clear improvement in the quality of its short-term forecasts. The review also spotlighted more accurate agrometeorological forecasting, mainly with training and technical assistance on sub-seasonal forecasting.

Capacity building has driven progress. Togo's hydrological service is working on its seasonal forecasting through a new system and training. Meanwhile, the integration of community vulnerabilities mapping and local level planning and response into the development of a Municipalities Master Plan, was cited as evidence of stronger civil protection services.

Central Africa

Implementation plan developed for severe weather and flood forecasting services, including **flash flood guidance systems** (FFGS) for the region. It will be tailored to each CREWS Central Africa country following a regional workshop in early 2024. **USD 450,000 of USAID funds** have been leveraged to implement the FFGS, which is part of an extension of CREWS West Africa FFGS initially implemented in 3 countries.

Needs and priorities for multi-hazard early warning of **9** countries[1] – were mapped for a diagnostic on multi-hazard early warning and the development of a sustainability plan for warning services.

Flash flood prediction and warning ever more critical in Central African countries such as Burundi where months of heavy rain have displaced hundreds of thousands of people.
© IOM 2024/Alexander Bee

1 Cameroon, Central African Republic, Chad, Congo Republic, DR Congo, Gabon, Equatorial Guinea, Rwanda, Sao Tomé and Principe.

East Africa

The first few months of operation focused on laying foundations and building capacity, including:

— Workshop co-designed with UK Met Office on impact-based early warning services for 5 countries[2] enabled development of workplans. Goal is to build on pilot regional early warning services through UK-funded HIGHWAY project for fishing communities along Lake Victoria – by expanding services to other areas.

— In **South Sudan**, the water resources Ministry will lead on initiative to improve observation data exchange and coordination with CREWS support. It aims to strengthen the generation and dissemination of hydro-met early warning services in the country through hydrology data collection and enhanced water information systems.

Years of consecutive floods have left two thirds of the people in South Sudan facing hunger. © WFP/Gabriela Vivacqua

Horn of Africa

Sudan – Conflict erupting first in Khartoum before spreading elsewhere put in-country CREWS activities on hold. A plan was devised to rescue SMA's weather and climate services and to support humanitarian action.

Somalia – Operational plan for National Emergency Operations Centre is being developed.

CREWS resources have also helped establish a Water Sector Coordination Facility, including a Hydromet Working Group (HWG). The Facility supports integrated and inclusive programming and coordination across government partners, donors, and non-governmental organizations (NGOs) – for coherence and effectiveness. The HWG supported development of a National Hydromet Policy.

Ethiopia – Initial engagement with government on impact-based flood early warning and flash flood forecasting systems support in **3** priority river basins, and on forecast-based financing and community preparedness. Terms of reference drafted for both.

2 Burundi, Kenya, South Sudan, Tanzania and Uganda.

Floods from heavier than usual seasonal rains followed one of Somalia's worst droughts in decades. © WFP/Abdirahman Yussuf Mohamud

South West Indian Ocean

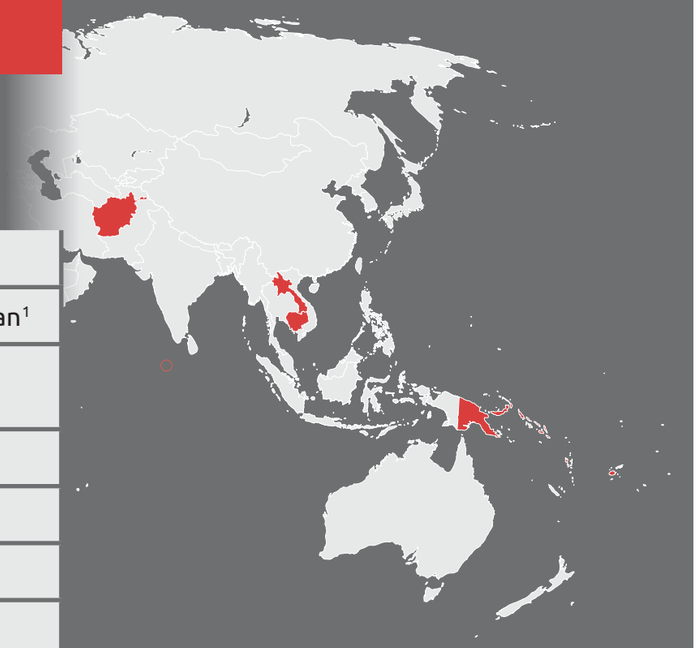
Madagascar – National Emergency Operations Plan (NEOP) developed via regional and national disaster management workshops involving government Ministries, NGOs and international partners. NEOP adoption expected in 2024 following consultations.

Findings and recommendations from early warning gap assessments for CREWS SWIO countries are informing new World Bank regional climate resilience project, particularly for Comoros and Madagascar.

Green Climate Fund/SAP-CREWS framework

Africa one of two regions where roll out was initiated on the GCF-CREWS framework to fast-track scaled-up early warning finance. The West African Development Bank requested support for Togo.

CREWS in Asia Pacific



19 countries assisted in 2023

1 country conflict-affected - Afghanistan[1]

5 countries with social/institutional fragility[2]

2 regional programmes

2 country programmes

3 accelerated support interventions

$18.83 million programme funding to date

> Being prepared is what counts when a disaster hits. Early warning systems are essential for being alert on time ahead of a disaster. CREWS makes an important contribution to support vulnerable people to make informed decisions on time.
>
> **Leonore Gewessler**
> *Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Austria*

1 https://thedocs.worldbank.org/en/doc/69b1d088e3c48ebe2cdf451e30284f04-0090082022/original/FCSList-FY23.pdf.
2 Marshall Islands, FS Micronesia, Papua New Guinea, Solomon Islands, Tuvalu.

2023 developments

Afghanistan

After two years essentially in limbo, CREWS Afghanistan has been revitalized. The project was extended to December 2025, and its objective revised. It will now focus on priorities identified by national partner institutions. The goal is to provide better quality hydro-met, climate and early warning services and build climate resilience of Afghan people.

Emphasis will be, among other things:

— enhancing and re-operationalizing a promising CREWS-supported drought early warning system put on hold since 2021, and developing agrometeorological advisory prototypes

— new and accessible products accompanied by thought-out dissemination strategies to reach both public and humanitarian agencies with tailored solutions

— technical and advisory support for key climate dependent socio-economic sectors – agriculture, water and energy

— producing high-resolution data on climate and hydro-met hazards.

Afghanistan, with an already largely arid climate, faces warming at a higher rate than the global average. Its water resources, with more droughts occurring, will be under even greater strain.[1] With these and other predicted changes, strengthening climate risk knowledge and resilience will be critical for a population where one in two is affected by poverty, and at least 15 million people are food insecure.[2]

Re-activating and upgrading the drought early warning system for Afghanistan a priority for CREWS. © WFP/Elise Blanchard

1 https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15396A-WB_Afghanistan%20Country%20Profile-WEB.pdf
2 https://thedocs.worldbank.org/en/doc/2ab75317f6e86c9bb6fcf342f72e0b64-0310012023/original/Afghanistan-Economic-Monitor-31-October-2023.pdf

Drought early warning legacy for Papua New Guinea

After six years, CREWS Papua New Guinea (PNG) finished its work. It aimed to strengthen weather and early warning systems through drought monitoring and build national Met Service capacities. The twinning of PNG's National Weather Service with its Australian equivalent, Bureau of Meteorology, enabled systems and products to be developed and tested to meet targeted goals.

6 key achievements:

- A **drought early warning system** in a country where nearly 8 in 10 people rely on subsistence farming. And where food insecurity is mostly due to crop failures from floods, drought, and frost through climate variability. A bonus, it is conversely serving to forecast floods.
- **Drought bulletins** and other developed products provide essential tools and information for climate-sensitive sectors for their planning. So far, at least 200 users from critical sectors such as energy, water and agriculture, businesses, and others subscribe to the bulletin. PNG's National Disaster Centre, UN Disaster Management Team, and other humanitarian agencies also use it to prepare for and respond to humanitarian needs. Nearly 40% of 10.3 million people live below the poverty line.
- PNG's first **operational seasonal forecast** in 2020 was an important milestone in transitioning to more accurate sub-seasonal to seasonal predictions for better crop yields. Monthly seasonal farm advisories tailored for smallholders based on the seasonal forecasts – also contribute to the country's climate smart agricultural aspirations.
- At least **10** climate risk information products and tools developed with CREWS PNG support. Adapting WMO's Space-based Weather and Climate Extremes Monitoring products for drought detection and monitoring to PNG – enabled basic monitoring of **drought, heavy rainfall** for floods, and **frosts.**
- By factoring user needs of different sectors into developing or improving weather and climate services, the PNG National Weather Service ensures they are – and stay – relevant. It is also well equipped to produce the drought bulletin using the drought monitoring tool, ensuring timely and proactive measures to minimize loss and damage.
- Weather forecasts and risk data from CREWS PNG are being used in collaboration with other projects. These include the development of an agricultural drought-triggering methodology for Anticipatory Action in the country – a first for PNG and the region, and seasonal advisories for farmers to ultimately produce more food.

> ''The CREWS project has really helped us. It is a really powerful way to do the drought forecast quickly. And we can begin to plan. We have a drought plan already made because of this system. We work very closely with the disaster teams and tell them 'look this threshold has already been reached and this is the action to take.' ''
>
> **Jimmy Gomoga**
> *Director, PNG National Weather Service*

Seasonal climate information helping farmers make informed decisions for better yields and improved food security in Papua New Guinea. © Mauro Okrupa

The Maldives

Data plays a key role in **accelerated support** for the **Maldives**. The intervention will help ensure coherence in the collection, access and use of national risk data and information for early warning and impact-based forecasting. Better access to – and use of – standardized climate and risk information will help speed up integration of risk analysis into disaster preparedness and risk management efforts. This includes a new system to track loss and damage from hazardous events that will contribute to a new national early warning system.

Tonga

A prototype application for a multi-hazard early warning and response system for communities developed with **accelerated support** for **Tonga** was tested and reviewed by key actors and community members. Feedback and suggested enhancements are being incorporated. When completed, its dynamic 2-way communication function will enable faster and tailored response to quick onset disasters such as earthquakes and tsunamis. With the app to be finalized by mid-2024, the timeframe for the intervention has been extended accordingly.

Vanuatu

Early warnings are only as good as the information they are based on. CREWS **accelerated support** for **Vanuatu** was greenlighted at the end of the year to help national meteorological and disaster-related institutions assess the accuracy, reach and effectiveness of early warnings. It followed two cyclones – Judy and Kevin – and a 6.5 magnitude earthquake affecting 80% of the population over 48 hours in March 2023.

Data and information will be analysed on hazards such as hurricane force winds, storm surges, floods, and landslides, damaged infrastructure, and the dissemination, reception, and responses to early warnings. Findings and discussions with affected communities will guide future early warning financing and Early Warnings for All activities in Vanuatu. The country is among Pacific SIDS predicted to suffer the highest GDP losses from disasters, and to face greater risk from more intense tropical cyclone activity over more parts of the country.

Vanuatu among most vulnerable Pacific SIDS to losses from disasters and more frequent cyclones. © Vanuatu Red Cross

Cambodia and Lao PDR

2 needs assessments for strengthening hydro-met networks in Cambodia and Lao PDR completed. Draft investment plans being finalized.

Hydrological models and forecasting based on **flash flood early warning systems** for 6 river basins in the two countries in development. They are due for testing during the 2024 monsoon.

Technical evaluation of 2-way communication for **early warning system** completed and options identified for installation in national EWS1294 dashboard in 2024. A 2-way system with an effective feedback mechanism helps ensure better quality, relevance and understanding of warning information for those receiving it. For the most vulnerable, such as women and people with disabilities, this will be critical.

Social protection for when things go wrong

How can **Cambodia** better understand social and economic vulnerabilties of people affected by climate shocks like floods and drought? Doing so would help identify and prioritize people most in need of humanitarian aid. The country suffers resilience-depleting recurrent floods, cyclones and storms, with people and communities forced to to pick up pieces and start over – time and time again.

A vulnerabilty and risk analysis supported by CREWS aims to do just that. It provides a detailed geographical overview of underlying socio-economic vulnerabilites and risks related to floods and drought. Preliminary findings, validated by 39 people from different Cambodian ministries and development partner agencies, are informing an anticipatory flood action plan to deliver **shock responsive social protection** – a social safety net for when things go wrong using different actions to help people initially cope with – and then recover – from a shocking event. Consultations with communities in a pilot river basin in Pursat province are feeding into early action and anticipatory action protocols to save lives and reduce damage. A similar analysis and plan will be developed in Lao in 2024.

Pacific Small Island Developing States

Training in late 2023 for **23** participants from **12** Pacific SIDS on Common Alerting Protocol (CAP) implementation, operational and sustainable management to disseminate warnings. A key first step, it should eventually lead to CAP's wider use in the region. A 13th Pacific SIDS and a training resource – the Solomon Islands – is the regional CAP champion. The only CAP adopter in the Pacific, it issued **481 alerts** in 2023.

Wide use and reach of the common alerting protocol in the Pacific would help people take timely action to minimize loss and damage.
© UNICEF/Bobby Shing

Green Climate Fund/SAP-CREWS framework

Cambodia and Fiji have expressed interest to scale up their CREWS projects through GCF SAP resources with the support of a GCF accredited entity. Discussions are underway and roll out is expected in 2024.

© IOM/Muse Mohammed

CREWS in the Caribbean

20 countries assisted in 2023

1 country with social/institutional fragility - Haiti

1 regional programme

1 country programme

1 accelerated support intervention

$8.58 million programme funding to date

Recent unprecedented climate events have emphasized the critical importance of deploying early warning systems to bolster the resilience of populations. Supporting the CREWS Initiative is investing in an efficient mechanism dedicated to advancing tangible and impactful solutions in regions most vulnerable to climate-related challenges. It also stands as a demonstration of our solidarity with the communities bearing the brunt of the impacts.

Isabelle Berro-Amadeï
Minister of Foreign Affairs and Cooperation, Monaco

2023 developments

Haiti

Work got underway on systems to improve services provided by Haiti's Hydrometeorological Unit – UHM. Strengthening flood forecasting generally will contribute to early warning systems in **2** river basins – Jacqmel and Grise – providing greater protection for the population there. A co-designed operational training programme for 2024 will underpin this effort.

Cuba

The go-ahead for **accelerated support** for **Cuba** at the end of 2023 should lead to national hydro-met institutions working more effectively together to produce more accurate information. This will strengthen their decision-making on warnings and help priority sectors plan better. An initial assessment will feed into an action plan to provide agriculture, disaster risk reduction, energy, and health sectors with new and improved services. It will also contribute to strategies on national disaster risk reduction.

Critical sectors such as agriculture need more accurate weather and climate information for planning in Cuba. © FAO/GRANMA

Green Climate Fund/SAP-CREWS framework

Three Caribbean countries began discussions on developing proposals to fast-track GCF support through a scaling up framework with CREWS: Belize, Trinidad and Tobago, and potentially also Haiti. The first two countries will begin work on their scaled-up proposals with their accredited entity, the Caribbean Development Bank in early 2024.

One door closes and another opens for the Caribbean

After five years during which extra funding was given to invest in disaster response capacities of people and institutions, CREWS Caribbean completed its work – and on time. In those years, it laid solid early warning foundations for the region to build upon. A **strategic roadmap** with an economic analysis to streamline and strengthen multi-hazard early warning systems framed the project. It was accompanied by a strong focus on hydro-met governance and strategies to deliver weather, water, and climate services. All of which was underpinned by operational support to help better protect communities and whole populations through new or improved forecasting, warning or awareness and early action on different hazards.

A regional project aiming for early warning coherence across the region, still delivered legal, strategic, and operational support that could be – and was – adapted to national contexts. It also extended support to 4 more countries than originally planned, with Canadian funds enabling an integrated river flood early warning system in the Dominican Republic. While the launch of a weather app for Jamaica provided a last hurrah for Caribbean 1.0., approval was given for the development of CREWS Caribbean 2.0, with a budget of USD 7 million.

This second multi-year regional investment to be implemented by WMO and UNDRR, will build on achievements from the first. It will continue to strengthen multi-hazard early warning system governance at national and regional level and enable better monitoring and forecasting. The co-designed project will also focus on improving disaster risk knowledge and decision-making – from national to community level – and warning dissemination and communication. There will be a particular push to reach and involve the most vulnerable people and communities to build their capacity to respond to early warnings.

Dominica, like others in the Caribbean, can suffer from multiple hurricanes in one season. A focus of CREWS Caribbean 2.0 is to help communities be more resilient to hazards via early warning response. © UNICEF/Manuel Moreno Gonzalez

CREWS Caribbean in numbers

With CREWS support:

5.3 million people in **14** countries with new or improved forecast or early warning services

21 national plans, strategies or laws on early warning developed and approved

6 hazards for which forecasting and warning services are in place

10 risk data tools / products developed or strengthened for early warning or enhanced services

6 forecasting and prediction products developed and / or tailored to user needs

6 Standard Operating Procedures (SOPs), operational preparedness or anticipatory action plans linked to prediction and warning services

1 country – Belize – adopting Common Alerting Protocol (CAP) and issuing warnings

417+ people trained and applying strengthened forecasting / early warning skills and knowledge

Flood marking, one of the ways a vulnerable community in Trinidad and Tobago was supported in managing flood risk. © Trinidad and Tobago Red Cross

CREWS Caribbean's socio-economic analysis of strong hydro-met and early warning service value identified significant regional productivity benefits for sectors such as agriculture. © UNDP/Pierre Michel Jean

Building momentum

…..between CREWS and Early Warnings for All

CREWS continued to demonstrate it is the most effective business model to deliver on the Early Warnings for All (EW4All) goal in in LDCs and SIDS.

Implementing EW4All through CREWS not only made common sense, it would also be a driver to initiate action in countries. CREWS funds were already supporting 27 of the 30 EW4All kick-off countries through projects that encompass all EW4All pillars.

CREWS Steering Committee Chair membership on the EW4All Advisory Panel provided a strategic platform to align vision and collaborative action between different entities and mechanisms already in place. At CREWS, that translated into decisions to alter its operational modalities to achieve alignment – and with it, scaled-up early warning finance and operations.

Among key decisions, CREWS:

— to modify its operational procedures to allow alignment with EW4All.

— to formally strengthen programmatic role to ensure funding of two EW4All pillars lead organizations – IFRC and ITU. And potentially of other operational partners.

— to ensure funding decisions on new projects and interventions from its pipeline list would be informed by data on the 30 EW4All kick-off countries, and pipeline countries of other early warning partners. They include GCF, the World Bank and Systematic Observations Financing Facility (SOFF). To underline this, a potential CREWS project to accelerate EW4All was to be closely worked on with all four pillar leads, including CREWS Implementing Partners, WMO and UNDRR.

— to also align a monitoring, evaluation, and accountability framework it was developing with that of EW4All and its theory of change. In addition, CREWS' active engagement on developing an Early Warning Maturity Index which could be used to assess the impact of its own investments.

In parallel and operationally, CREWS projects were a vehicle to kickstart and help drive EW4All forward in different countries and regions.

In Malawi, post-cyclone Freddy, a multi-hazard early warning system diagnostic and roadmap was requested of CREWS. The objective: to support the country's Early Warnings for All goal in the coming years. By end of year, an initial assessment had been completed – and nearly 50 new met technicians on weather observation had been recruited and trained to ramp up skills and capacity on one of the four EW4All pillars.

With CREWS South West Indian Ocean support, an EW4All launch in Mauritius resulted in a gap analysis, and the development of a coordination mechanism for partners with a roadmap to achieve the goal. Its validation is expected in 2024.

CREWS also provided technical support at the EW4All launch in South Sudan while supporting a national consultation in Somalia.

In South Sudan, priorities were identified in addressing early warning gaps, e.g. data, risk knowledge use, and loss and damage accounting. This will help finalize South Sudan's roadmap and action plan.

Priorities were also pinpointed during the national EW4All consultation in Mogadishu. These frame CREWS early warning and risk assessment support to Somalia through CREWS Horn of Africa and provide the basis of technical work. A workplan to implement probabilistic flood and drought risk assessment was developed – and endorsed – by national disaster management authorities.

CREWS Cambodia and Lao PDR has been similarly instrumental on EW4All with implementing and operational partners supporting both national entities to get the initiative off the ground. In Lao, a draft EW4All roadmap was developed following national multi-partner consultation and coordination sessions and an assessment on existing capacity. Roles and responsibilities on a mechanism for EW4All coordination were assigned to the climate change

More frequent and longer lasting droughts a key reason why Somalia has one of the most enduring food crises.
© FAO/Arete/Moustapha Negueye

ministry and national hydro-met services. The Labour and Social Welfare Ministry is to roll out and monitor road map implementation.

A CREWS-sponsored national consultation in Cambodia also enabled an early warning stocktake and mapping of what needs doing for progress on early warning. Cambodia too will have a national coordination mechanism but anchored in an existing early warning coordination structure. While Cambodia is yet to develop a draft roadmap with priority actions up until 2017, CREWS-supported national coordinators in the two countries work with respective governments on the roadmaps. Both countries will use them to leverage financial and technical resources from within – and outside of CREWS.

Elsewhere, 10 Pacific Small Island Developing States were helped to attend a regional tropical cyclone committee meeting which included a special session on EW4All. In the Caribbean, a technical study to develop a regional Emergency Alert (and dissemination) System in the Caribbean was done. Conclusions feed into pillar 3 recommendations of the EW4All global initiative.

….. within CREWS

The sense of urgency that had defined the early warning sphere in 2022 had translated into another shift in gears at CREWS in 2023. An external evaluation of CREWS' first five years and EW4All had triggered a series of initiatives and institutional changes driving and reshaping CREWS for the future.

The revision of its operational procedures to allow EW4All pillar leads ITU and IFRC to work formally in CREWS projects – alongside WMO, World Bank/GFDRR and UNDRR – will potentially enable other organizations to do the same. For that, an accreditation framework is being developed.

To further align with priorities and needs as identified by countries, there will be changes too in Implementing Partner roles and responsibilities and in the process for deciding which partner carries out a CREWS project. For greater operational efficiency and effectiveness with more implementing and operational partners, projects and interventions, a CREWS Operational Coordination Group is being created.

Regional organizations with the mandates, expertise and capacity are leading on CREWS-funded activities. These include the Caribbean Meteorological Organization (CMO), the Caribbean Disaster

New CREWS project in Djibouti to be implemented by several partners will strengthen national preparedness, early warning, early action and response. © Djibouti Red Crescent

Emergency Management Agency (CDEMA), the Caribbean Institute for Meteorology and Hydrology (CIMH), the IGAD Climate Prediction & Applications Centre (ICPAC), and the Secretariat of the Pacific Regional Environment Programme (SPREP).

Operationally, considerations are also being given on support for conflict-affected or fragile States outside of CREWS' current remit. Meanwhile, a strategy and operational procedures to facilitate and harness private sector engagement in country operations aim to strengthen and sustain people-centred early warning services. Such engagement nevertheless to be optional.

CREWS' approval of new funding for the Caribbean, Djibouti and Niger, and accelerated support for four countries during the year with plans to fund many more in 2024, underlined the rapid expansion of CREWS' work. In three years, CREWS operations had doubled.

Such growth had already forced a rethink and initiated action on more robust tracking of its results. EW4All had added further impetus to ensure CREWS' monitoring and evaluation of its operations kept pace with growth, better captured progress, and tangibly demonstrated its impact and contribution on early warning for everyone.

It was not only critical to develop a Monitoring, Evaluation, Accountability and Learning Framework (MEAL), it was essential to get it right. Its finalization and application from 2024 will be defining.

…… with partners

After more than a year in development and planning, the **Green Climate Fund (GCF)/CREWS Scaling-up Framework** and proposed roll-out was given the green light by CREWS Members. A mechanism to fast-track larger amounts of early warning finance for successfully completed CREWS projects with potential to amplify impact – it rapidly generated a high level of interest and demand. In the end, it will be Belize, Cambodia, Fiji, Trinidad and Tobago, and Togo who will roll out the Framework once scaled-up proposals are written and approved. An example of the coherence and effectiveness needed for early warnings for everyone.

While CREWS and GCF regularly review the Framework pipeline for alignment and coherence, CREWS does something similar with other partners, including **Global Shield** and **SOFF**. The former provides inputs on CREWS' pipeline projects on leveraging and synergy potential. Further engagement to continue with the Global Shield against Climate Risks Initiative launched at COP27, with CREWS to contribute to the initiative's work in pathfinder countries and regions where CREWS has investments.

In addition to sharing CREWS' pipeline information, CREWS and SOFF have agreed on complementarity, collaboration, and joint action to strengthen systematic climate observation. The agreement, a Cooperation Framework signed at COP28 along with other climate financing institutions – GCF, the Adaptation Fund, Climate Investment Funds, and the Global Environment Facility – aims to help close the data gap and pave the way for better use of basic weather and data for effective climate action.

A cooperation framework with the **UK Met Office** – the first of its kind for CREWS – enables projects to draw on UK Met Office's expert and advisory support and will serve as a template for agreements with other meteorological agencies. These cooperation frameworks will systemize, structure, and replicate the twinning of national hydro-met services in ongoing CREWS projects to better tap into their expertise. And to promote cooperation between them.

© IOM/Muse Mohammed

Financials

2023 marked a significant increase in CREWS membership with three new Members. Austria, Monaco and Norway pledged a combined USD 18.32 million to the CREWS Initiative, with Monaco and Norway making their contributions over multiple years. With their joining Australia, Finland, France, Germany, Luxembourg, the Netherlands, Switzerland, and the United Kingdom, there are now 12 CREWS Members. The CREWS Initiative thanks Members for their generous support in 2023.

Fund contributions

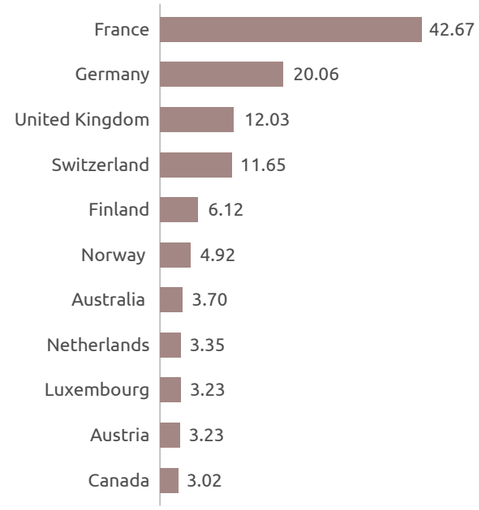
By year end, pledges and contributions to the CREWS Initiative totalled USD 130.48 million since Trust Fund inception. Of this, USD 104.39 million was received. During 2023, USD 8.69 million was contributed by France and USD 1.58 million by Luxembourg as new funding. As part of their multi-year agreements, USD 3.02 million was received from Canada, USD 4.92 million from Norway, and USD 0.56 million from Switzerland. Contribution agreements were also signed for USD 6.37 million with the United Kingdom, USD 3.32 million with Austria and EUR 0.10 million with Monaco.

The Trust Fund also earned about USD 3.31 million so far in investment income on its liquid balances and that received from the implementing partners.

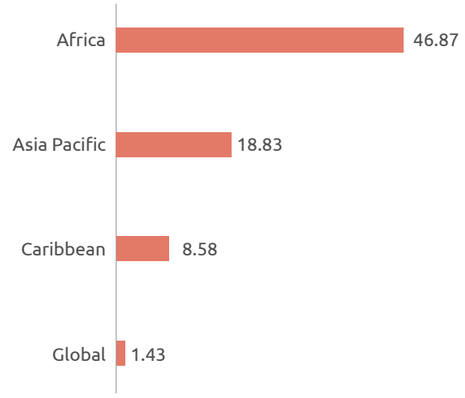
Project funding

USD 83.66 million had so far been allocated to cover all costs related to CREWS country, regional and global programming, administration, and Fund Trustee. Of this, 80.6% was directly for projects. Growing financial support for CREWS meant USD 24.04 million were available to support new funding decisions by the Steering Committee at the close of 2023.

CREWS Trust Fund received contributions
in USD millions, as of 31 December 2023



Funding decisions by projects*
in USD millions, as of 31 December 2023



**Figures may differ from the Trustee due to different aggregation method, and timing of report and include Implementing Partner fees. Regions cover regional, multi-year country projects and Accelerated Support interventions.*

CREWS Trust Fund Summary – Inception through December 31, 2023 *in USD millions*	Total	% of Total
Donor Pledges and Contributions		
Contributions	125.44	96.1%
Pledges	5.04	3.9%
Total Pledges and Contributions	**130.48**	**100.0%**
Cumulative Resources		
Resources received		
Cash Receipts	104.39	78.0%
Investment Income earned a/	3.31	2.5%
Total Resources Received	**107.70**	**80.5%**
Resources not yet Received		
Contributions not yet received	21.05	15.7%
Pledges	5.04	3.8%
Total resources not yet received	**26.09**	**19.5%**
Total Potential Resources (A) ***(in USD millions)***	**133.79**	**100.0%**
Cumulative Funding Decisions		
Projects	67.41	80.6%
Fees	8.30	9.9%
Administrative Budget	7.95	9.5%
Total Funding Decisions Net of Cancellations (B)	**83.66**	**100.0%**
Total Potential Resources Net of Funding Decisions (A) - (B)	**50.13**	
Funds Available		
Funds Held in Trust with no restrictions	24.76	
Approved Amounts Pending Cash Transfers	0.72	
Total Funds Available to Support Steering Committee Decisions	**24.04**	

a/ Represents investment income earned on the liquid balances of the CREWS Trust Fund and investment income received from IPs

Note: Sub-totals may not add up due to rounding.

Sustainable investment

Since 2019, the CREWS Trustee (World Bank) has been integrating Environmental, Social and Governance (ESG) factors into its investment processes as part of a Sustainable and Responsible Investment (SRI) approach to investment management. The CREWS investment portfolio is primarily comprised of short-term high-grade fixed income securities.

As of 31 December 2023, the portfolio has an ESG Quality Score of 6.55 out of 10 and an ESG Rating of A.[1] CREWS investment portfolio now falls in the average decile of the ratings universe, reflecting average capability of its portfolio holdings to manage key medium to long term risks and opportunities arising from ESG factors.[2]

1 https://fiftrustee.worldbank.org/content/dam/fif/funds/crews/TrusteeReports/CREWS%20Trustee%20Report%20-%20December%2031%202023.pdf
2 Details on ratings methodology used can be found here

Appendix

CREWS operations in 2023

PROGRAMME TYPE	BUDGET	DURATION/STATUS	LEVERAGING
Country			
Afghanistan	$3.66m	2019 – 2025 Extended	$400K
Burkina Faso	$2.19m	2017 – 2025	$35.4m
Chad	$3.19m	2019 – 2024	$156m
DR Congo	$3.09m	2017 – 2025 Extended	$8
Haiti	$1.5m	2021 – 2024 Extended	$35m
Malawi	$3m	2022 – 2026	N/A
Mali	$3.33m	2017 – 2024 Extended	$31m
Papua New Guinea	$1.65m	Completed 2023	$600K
Togo	$2.36m	2019 – 2024	$35m
Togo	$2.36m	2019 – 2024	$35m
Regional			
Cambodia/Lao PDR	$5.54m	2021 – 2025	$58m
Caribbean	$6.5m	Completed 2023	$1.5m
Central Africa	$4.85m	2022 – 2026	$102m
East Africa	$7m	2022 – 2026	$7m
Horn of Africa	$5.24m	2022 – 2026	$47.8m
Pacific	$4.79m	2021 – 2024	$65m
South West Indian Ocean	$4m	2020 – 2025	$100m
West Africa	$5.3m	2018 – 2024	$51m
Accelerated Support Window			
Benin	$250,000	2022 – 2024 Extended	
Cuba	$250,000	2023 – 2024	
Maldives	$242,950	2023 – 2024	
Sierra Leone	$250,000	2023 – 2024	
Tonga	$220,124	2022 – 2024 Extended	
Vanuatu	$226,000	2023 – 2024	

CREWS Implementing Partners

CREWS Operational Partners

The CREWS Initiative gratefully acknowledges the support of:

CREWS Members

Australia
Austria
Canada
Finland
France
Germany
Luxembourg
Monaco
Netherlands
Norway
Switzerland
United Kingdom (Chair)

CREWS Observers

European Commission
Japan
Mexico
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USAID

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